ACCESS TRAINING CENTRE

Training Manual

Front End Loader

Start time: 7.45am

Participants **must read this manual** prior to attending the training program and are required to **bring the manual to the training program.**

Participants must wear fully enclosed safety foot wear, long pants and long sleeve shirt.

It is a mandatory requirement that participants must bring photo Identification to training session i.e. Australian Drivers licence or passport (must contain photo, date of birth & signature). Failure to provide IDENTIFICATION will result in exclusion from the course.

Contents

Introduction

Front End Loader

You will learn about operations including:

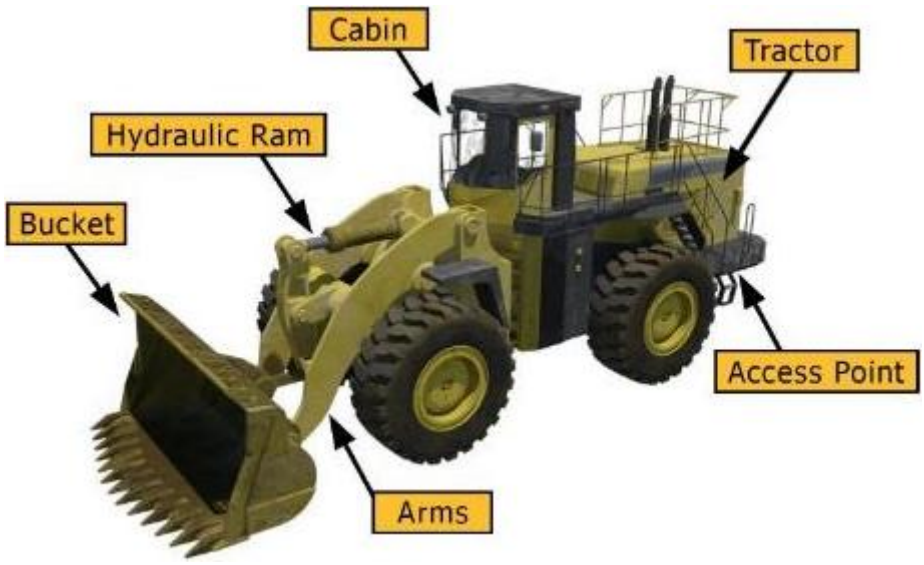
- Planning and preparing for work.
- Conducting routine checks.
- Operating Front End Loader.
- Relocating the Front End Loader.
- Maintenance and other housekeeping tasks.

What is a Wheeled Front End Loader?

A wheeled front end loader is a self-propelled machine that has a front mounted bucket connected to the end of two booms (arms). The bucket has a very large capacity, and may be removable or permanently mounted.

The machine is self-propelled, meaning that it has a powerful engine and does not require pushing, pulling or towing.

Front End Loader Components



Component	Description
Cabin	Where the operator sits. Contains the controls for the operation of the wheeled loader.
Tractor	Contains the engine of the machine.
Access Point	The point where the operator can safely access the loader cab.
Arms	Raises and lowers the bucket.
Bucket	Used to move materials. The most common attachment.
Hydraulic Ram	Moves the arms and bucket/attachment.

Front End Loader Operations

The tasks performed by a front end loader may include:

- Backfilling
- Loading Plant
- Lifting and carrying materials
- Levelling out surfaces
- Mixing materials
- Stripping or spreading topsoil and materials
- Site clean-up
- Cutting and boxing:
  - Cutting – removing material above a required level.
  - Boxing – removing materials below a level.

Work Health and Safety Requirements

WHS Legislation

Work Health & Safety (WHS) legislation is defined as laws and guidelines to help keep your workplace safe.

Legislation can be broken down into four main types:

Acts	Laws to protect the health, safety and welfare of people at work.
Regulations	Give more details or information on particular parts of the Act.
Codes of Practice	Provide practical instructions on how to meet the terms of the Law.
Australian Standards	Give you the minimum levels of performance or quality for a hazard, work process or product.

South Australia's work health and safety legislation includes the **Work Health and Safety Act 2012 (SA)** and the **Work Health and Safety Regulations 2012 (SA)**, which were adopted on the 1st January 2013.

Sources of Workplace Safety Information - Overview of Legislation

Work Health and Safety Act 2012 (SA)

The main object of the Act is to provide for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces

Work Health and Safety Regulations 2012 (SA)

The Work Health and Safety Regulations 2012 (SA) identifies the control measures that must be applied to specific work activities and hazards that occur in the workplace

Codes of Practice

This legislation is supported by Codes of Practice which provides practical information, or guidance, on how to meet the requirements of the regulations. Codes of practice are not mandatory but provide information to help workplaces achieve safe systems of work.

Australian Standards

Australian Standards set out specifications and procedures designed to ensure products, services and systems are safe, reliable and consistently perform the way they were intended to. They also act as guidance material to achieve compliance requirements with WHS legislation.

Duty of Care

Duty of Care means to take all necessary steps to work safely and provide a safe work place for yourself and others. Under the new WHS legislation, PCBU's and workers can be heavily fined or even imprisoned for not acting with Duty of Care.

1. There is a primary duty of care requiring ***persons conducting a business or undertaking (PCBU)*** to ensure, so far as is ***reasonably practicable***, the health and safety of ***workers*** and others who may be affected by the carrying out of work.

2. A requirement that ***officers*** of corporations and unincorporated bodies exercise ***due diligence*** to ensure compliance.

3. ***Workers*** must exercise reasonable care that their acts or omissions do not adversely affect the health and safety of persons at a workplace.

PCBU Duty of Care

Some important responsibilities of the PCBU/employer are to provide and maintain:

- A work environment without risks to health and safety
- Safe plant and structures
- Safe systems of work
- Adequate facilities
- Any information, training, instruction or supervision for the work to be undertaken safely
- Procedures and systems to ensure the safe use, handling and storage of plant, structures and substances

Worker Duty of Care

Some important responsibilities of the worker include:

- Take reasonable care for your own health and safety
- Take reasonable care for the health and safety of others who may be affected by their own acts or omissions
- Follow all workplace rules and instructions. Cooperate with anything the employer does to comply with WHS requirements
- Make sure all equipment is safe to use. Do not intentionally or recklessly interfere with or misuse anything provided at the workplace for WHS
- Carry out your work safely
- Report any problems
- If you are unsure, ask your boss or supervisor.

Operations Documentation

Before starting your work you need to make sure you have access to all operations documentation for the job. This will help you to do your work in the safest way and make sure all work is compliant.

Operations documentation includes:

- **Site Details** – The information and safety requirements of the workplace environment (where you will be working).
- **Hazard Details** – Any hazards in the work area or related to the work. This could also include instructions on how to handle dangerous or hazardous materials.
- **Task Details** – Instructions of what the work is or what you will be doing. Also instructions on how to safely do the job.
- **Faulty Equipment Procedures** – Isolation procedures to follow or forms to fill out.
- **Signage** – Site signage tells you what equipment you need to have, or areas that are not safe to be in.
- **Emergency Procedures** – Instructions on what to do in emergency situations, for example if there is fire, accident or emergency where evacuation or first aid is needed.
- **Equipment and Work Instructions** – Details of how to operate plant and equipment and the sequence of work to be done.

Your worksite will also have instructions for working safely including:

- Emergency procedures, including using fire fighting equipment, first aid and evacuation.
- Handling hazardous materials.
- Safe work practices
- Personal protective clothing and equipment.
- Safe use of tools and equipment.

Work Instructions

You need to be clear about what work you will be doing. Make sure you have everything about the job written down before you start. This includes what you will be doing, how you will be doing it and what equipment you will be using.

- **The Task** – What kind of material is being moved? How much is there to move? How long do you have to complete the work? Where will the load be discharged? Does the job need a special type of bucket?
- **Plant** – What type of plant will be used? How big is it? How much room does it need?
- **Communications** – How are you going to communicate with other workers?
- **Procedures & Rules** – Do you need any special permits or licences for the work? Are there site rules that affect the way you will do the work e.g. traffic control requirements?

Make sure you have all of the details about where you will be working. For example:

- **The Site** – Is there clear access for all equipment? Are there obstacles in the way? What are the ground conditions like? Is the site ready for your work to begin? Are there structures, workers, traffic or areas that you need to avoid?
- **The Weather** – Is there wind, rain or other bad weather? Is it too dark?
- **Traffic** – Are there people, vehicles or other equipment in the area that you need to think about? Do you need to get them moved out of the area? Do you need to set up barriers or signs?
- **Hazards** – Are there dangerous materials to work around or think about? Will you be working close to other people

All work needs to follow worksite, environment and company safety procedures.

Procedures help to make sure that all work:

- Is done in a safe way, without damaging equipment or putting people in unsafe situations.
- Is done in the correct order and doesn't interrupt or get in the way of other work that is happening on the site.

This is especially important in civil construction projects that need to be completed in a particular sequence.

Your work instructions will tell you the safest way to do the job, and the equipment that you will need to use. It is a good idea to check your work instructions with your boss or supervisor to make sure you know exactly what you need to do.

Plant Operations – Front End Loader

Most actions occur through the front end loader's forward movement. The loader is capable of:

- Mixing materials
- Stripping or spreading topsoil and materials
- Loading
- Cutting and boxing
- Backfilling
- Lifting and carrying materials
- Site clean up
- Levelling out surfaces

Safe Work Method Statements

Many worksites require a Safe Work Method Statement (SWMS) before any work can start. A SWMS is a list of steps that outlines how a job will be done. It also includes any hazards that occur at each step, and what you need to do about them.

Other types of work method Statements can include Job Safety Analysis (JSA) or Safe Operating Procedure (SOP).

SWMS are a great tool for organising your work activities and making sure you have completed everything. They will also outline the details of all tools, equipment and coordination with other workers relating to your job. Make sure all of these are available and ready before you start.

Project Quality Requirements

Every civil construction project will have quality requirements. These outline when tasks need to be completed and the required standard of the work.

Your work instructions and plans or drawings will guide you, and help you to make sure you are achieving the quality standard for the project.

They can include:

- Project dimensions.
- Project tolerances.
- Standards of work.
- Material standards.

Site Material Characteristics

Make sure you are familiar with the site product or materials before you start to move them around.

Have a look at the composition of the materials to see what kind of equipment you will need to move them, and what techniques to use.

Some materials are more cohesive or sticky while others may be much less stable to work with, or create hazards like dust or damage to equipment if they are not handled just the right way.

Part of the civil construction project may involve compacting materials as part of preparing a site or creating roads. You will need to confirm the level of compaction that is needed in your work instructions or project plans.

Plans, Drawings and Sketches

When looking for information or instructions for a civil construction project, you will come across plans, drawings and sketches. Examples of these are:

- Project plans.
- Site plans.
- Work plans
- Project drawings.
- Sketches made to explain work that is happening on site.

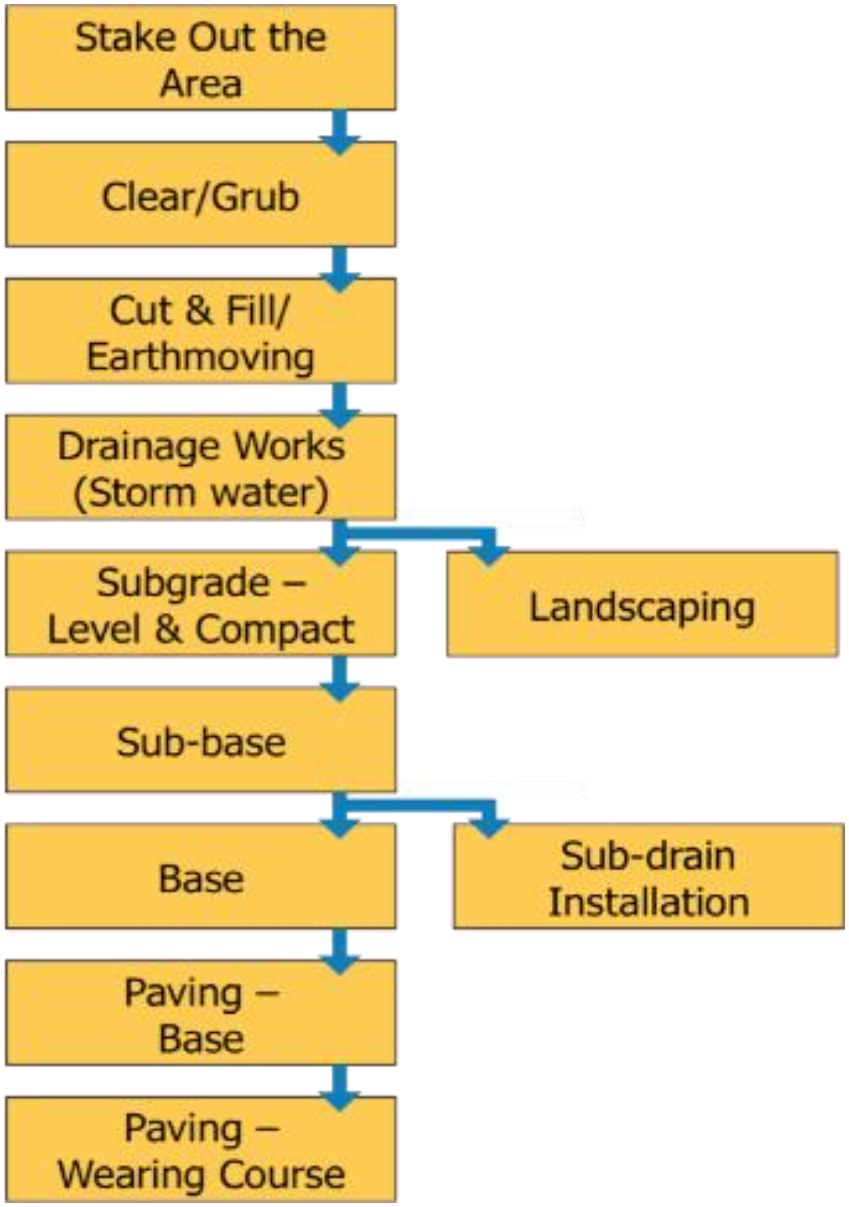
Plans and drawings are useful because they can help you to get an overview of the site and the project as a whole. It can also be the best way to explain exactly what needs to be done.

You need to be familiar with the scale and symbols used in the plans and drawings so you can understand them properly. If you're not sure ask your supervisor or site personnel for help.

Civil Construction Sequences

Civil construction projects are made up of a range of smaller tasks or activities. It is important that these are done in the right order for the project to go smoothly.

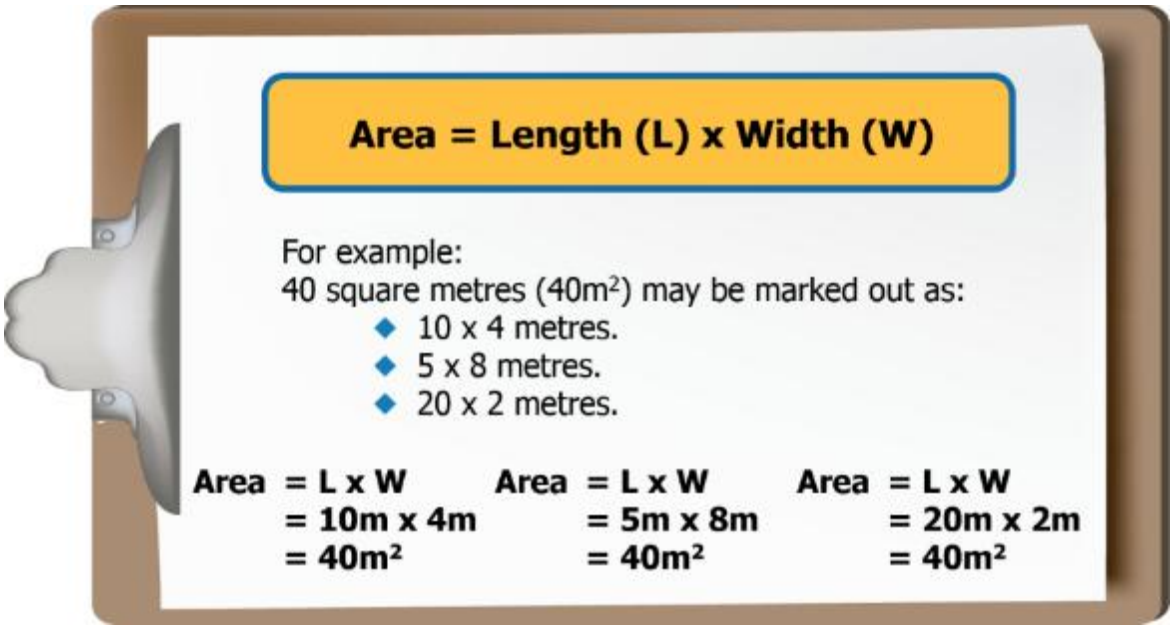
Here is a basic civil construction sequence from clearing the area through to preparing for road construction:



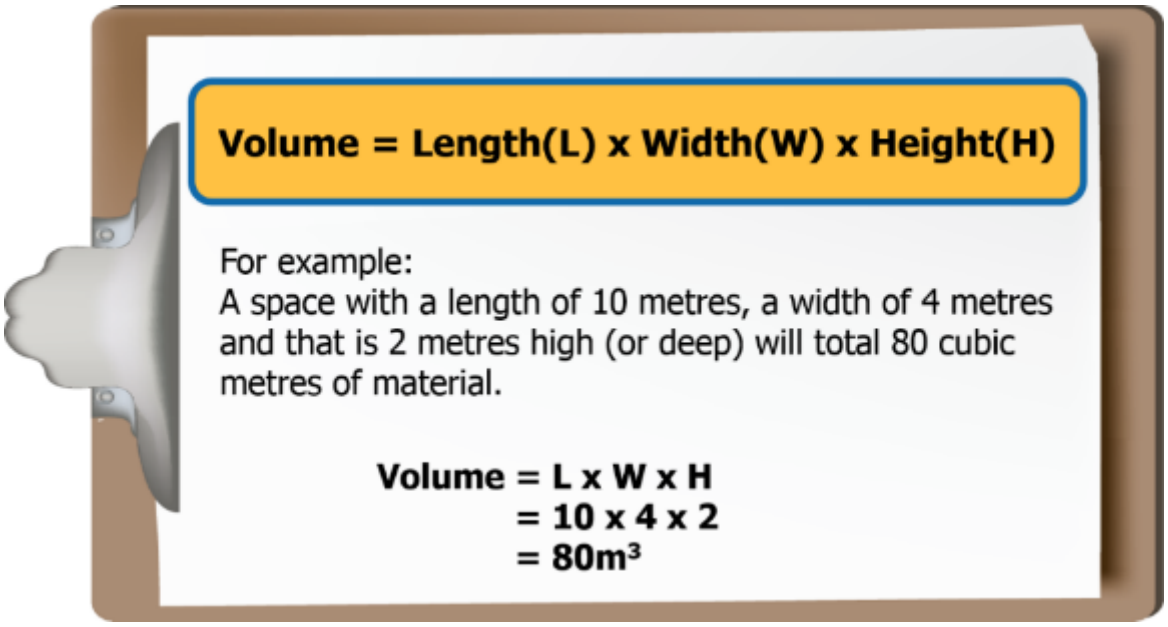
Basic Earthworks Calculations

As a loader operator, the two main calculations you will need to be able to apply are for Area and Volume.

Area can be calculated using the following formula:



Volume can be calculated using the following formula:



Emergency Procedures

Emergency procedures will vary depending upon the worksite. These procedures could include:

- Emergency shutdown.
- Evacuation.
- First aid.
- Fire fighting.

Emergency Shutdown of Equipment

If there is a fire, emergency or accident you might need to use the emergency stop on the equipment you are using. This will turn the equipment off immediately. You can also use the emergency stop if the equipment stops working properly or you lose control of the equipment.

Evacuation

Things to remember are:

1. Keep calm.
2. Move away from the danger to a designated evacuation point, sometimes called an emergency assembly area.
3. Do not let other people into the area.
4. Call emergency services in accordance with workplace procedures and policies.

Every workplace has a legal responsibility for ensuring adequate first aid provisions and first aid officers as required by SafeWork SA.

First Aid

First Aid is the quick care given to an injured or ill person. Every site will have a First Aid Officer.

If somebody needs first aid you must tell your supervisor or First Aid Officer.

Do not try to give first aid if you have not been trained.

If you do provide first aid, only apply techniques to the level that you have been trained.

Fire Fighting Equipment

Fire fighting equipment on site could be anything from small fire extinguishers through to large water cannons. Different fire fighting equipment should be used for different types of fire. Always check the equipment for information on what type of fire it can be used on.

Steps for using a fire extinguisher:

1. Evacuate the area.
2. Isolate the area.
3. Call emergency services or follow other designated on site procedure.
4. If it is safe to do so, use an extinguisher to attempt to control the fire using the **PASS** system.

The **PASS** system:

P	**Pull** the pin.
A	**Aim** at the base of the fire.
S	**Squeeze** the trigger.
S	**Sweep** the base of the fire.

Contact your site emergency management team as soon as possible and call the fire brigade on 000.

Hazard Identification and Control

Before you start work, you need to check for any hazards or dangers in the area. If you find a hazard or danger you need to do something to control it. This will help to make the workplace safer.

The best way to control hazards is to use a simple problem-solving approach:

1. **Identify the problem.** What is the hazard?
2. **Identify the cause of the problem.** What is causing the hazard?
3. **Work out the different options that you have to solve the problem.** What can be done to eliminate or minimise the hazard as much as possible
4. **Choose the best option to solve the problem and apply it.** What is the best option to eliminate or minimise the hazard?
5. **Check to see if the problem has been solved.** Has the hazard been eliminated or reduced to a safe level? If not, you will need to use additional, or better options for fixing the problem (controlling the hazard).

Identify Hazards

Part of your job is to look around to see if you can find any hazards before you start any work.

A hazard is a thing or situation that causes injury, harm or damage.

Make sure you look everywhere. A good way to do this is to check:

- Up high above your head.
- All around you at eye level.
- Down low on the ground (and also think about what is under the ground).

Some hazards you should check for in and around the work area include:

- Overhead and underground services.
- Uneven, soft, slippery or unstable terrain.
- Trees
- Fires.
- Bridges.
- Excavations.
- Buildings and structures such as site offices and scaffolds.
- Traffic. – vehicle and people
- Embankments
- Cuttings.
- The weather and environment.
- Poorly maintained or faulty equipment.
- Hazards from components of the plant *(e.g. hoses under pressure, hydraulic tanks, cooling systems or braking systems).*
- Road surface and edge solidity.
- Handling characteristics of the plant
- Effects of the load as you move or scoop it.
- Hazardous materials. or chemical hazards *such as fuel, chemicals, contaminants, gases or dusts.*

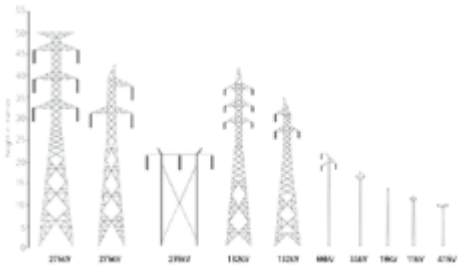
Power Lines

The different states and territories have standards and regulations for working near power lines.

It is important that you identify possible risks when working around power lines and follow relevant safe working power line distances.

- Low Voltage up to and including 132kV (usually poles)
- High Voltage over 132kV (towers)

Consult the relevant local electrical authority for advice if you are unsure of the voltage of the overhead electric/power lines.



In South Australia, contact SA Power Networks or ElectraNet for information regarding power lines.

Safe Power Line Working Distances

If you need to work closer than the minimum safe distances:

- **Get an access permit** from the relevant authority
- Where possible, organise with the relevant authority to have the **power disconnected** or appropriately insulated
- **Use of a Spotter** / Safety Observer within the exclusion zone

A ‘spotter’ is a competent person who watches and guides plant and equipment around electric/power lines. Approval from SA Power Networks (SAPN) is required when using a spotter in South Australia.

In South Australia, equipment must not be closer than the following distances:

Electric/Power Line Type	Distance
Distribution lines (poles) up to and including 132kV with a spotter	**3 m**
Distribution lines (poles) up to and including 132kV	**6.4 m**
Transmission lines (tower) up to 275kV with a spotter	**8 m**
Transmission lines (tower) up to 275kV	**10 m**

Power Line Identification

Electrical power lines are often identified by the following:

- **Tiger tails**
- Power line **marker balls**
- Electrical safety **warning/danger signs**
- Painting the lower section of the pole up to 3 metres above the ground

It is important to note that tiger tails **DO NOT** insulate the electric/power lines so exclusion zones and safe operating distances must still be maintained, even when tiger tails are present.

Contact with Power Lines

If the Earthmoving plant comes into contact with power lines:

- Stay calm, remain in your seat and warn others to stay away
- Attempt to break contact
- Stay in the Earthmoving plant if safe to do so. If you must leave:
  - Jump clear of the plant
  - Don't have contact with plant and ground at the same time,
  - Land with your feet together
  - Hop/shuffle with your feet together until you are at least ten (10) metres clear of the plant
- Remain a safe distance from the plant and report to management, power company and safety regulator
- Have the machine checked before reuse

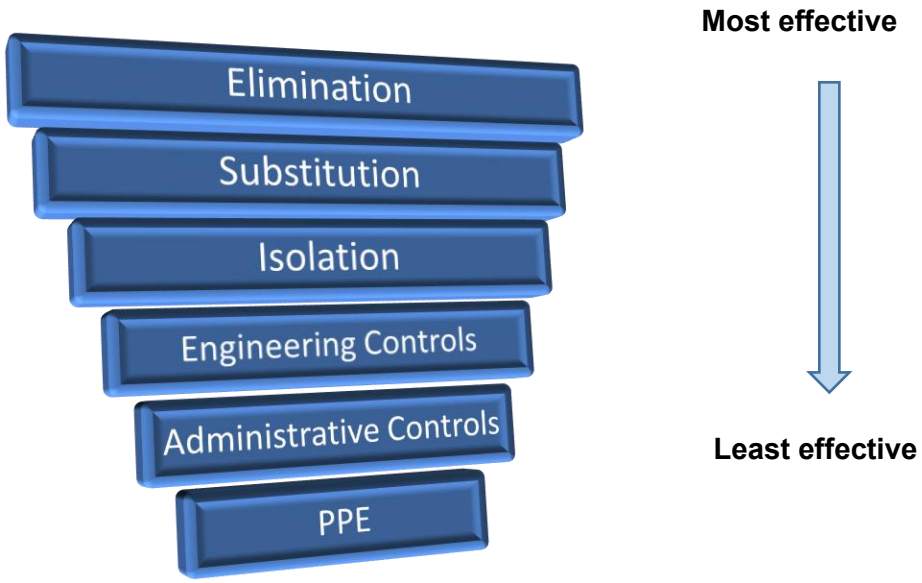
Control Hazards

Hierarchy of Control

After identifying the hazards, implement the controls **prior to starting** and **during the task** as they arise.

Controlling risks involves selecting one or more options to modify a risk and then implementing the selected control option/s. You may need to use a number of control strategies together to reduce the risk level to an acceptable level.

The Hierarchy of Control is the name given to a range of control methods used to eliminate or control hazards and risks in the workplace.



1. Elimination	Completely remove the hazard. The best kind of hazard control.
2. Substitution	Swap a dangerous method or situation for one less dangerous.
3. Isolation	Isolate or restrict access to the hazard.
4. Engineering Controls	Use equipment to lower the risk level.
5. Administrative Controls	Site rules and policies attempt to control a hazard.
6. PPE	The least effective control. Use PPE while you work.

Hazard control measures need to be put in place before you start your work, or as soon as you see a hazard while you are doing your work.

Once a hazard control is in place you will need to check to make sure it is working well to control the hazard or danger.

Talk to your supervisor or safety officer if you are not sure if it is safe enough to carry out your work. If you think the hazard is still too dangerous – **Do not start the work.**

Personal Protective Equipment

Personal Protective Equipment (PPE) is clothing and equipment designed to lower the chance of you being hurt on the job. It is required to enter most work sites.

It includes:

- **Head protection** – hard hats and helmets.
- **Foot protection** – non-slip work boots.
- **Hand protection** – gloves
- **Eye protection** – goggles, visors or glasses.
- **Ear protection** – plugs or muffs
- **Breathing protection** – masks or respirators.
- **Hi-visibility clothing** – clothing that makes you stand out and lets other people know where you are.
- **Weather protection** – clothing that protects you from the sun or from the cold.

Make sure any PPE you are wearing is in good condition, fits well and is right for the job.

If you find any PPE that is not in good condition, tag it and remove it from service. Then tell your supervisor about the problem and they will organise to repair or replace the PPE.

Traffic Control Barricades and Signage

Different control measures can be implemented to prevent interaction of pedestrians, workers and other traffic in the work area, including:

- Exclusion zones
- Warning signs
- Barriers / Hoardings
- Flashing hazards lights
- Traffic management plan
- Traffic Controller (qualified)

Traffic Management Plans

There are two different types of traffic management plans:

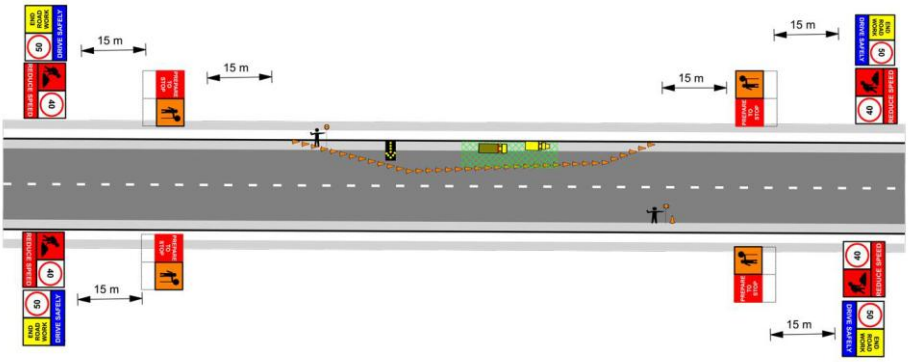
Traffic Management Plan

Vehicle Management Plan

- Traffic Management Plan – deals with traffic moving through the site, i.e. traffic on public roads and members of the public
- Vehicle Management Plan – deals with on-site vehicle movements, haul circuits and dump runs, and material routes.

As part of planning your work you need to confirm that the traffic management plan has been implemented according to workplace procedures.

Reading the plans will show you where particular signs, barricades and flashing lights need to be placed.



The traffic management plan aims to:

- Protect workers, road users and pedestrians by excluding them from crossing each other's spaces
- Guide road users or pedestrians safely through or around the worksite
- Provide proper warnings of changes in conditions ahead
- Provide warning of work or workers ahead
- Communicate details of works and possible impacts
- Reduce the impact of disruptions to the public and the job

Most worksites will have their own traffic management plan already in place. Consult with the relevant site personnel on working within their traffic management plan, and discuss any additions that may need to be made.

Traffic management conducted on public roads may require a traffic management plan submitted to the local government authorities. It is important to note that any person implementing a traffic management plan must have a Temporary Traffic Management qualification.

Environmental Protection Requirements

Environmental protection requirements are part of every worksite. Make sure you check with your supervisor about what environmental issues need to be managed during your work.

All environmental details should be listed in an 'Environmental Management Plan' for the site. It can include details for:

- Waste management.
- Water quality protection.
- Noise control.
- Vibration control.
- Dust management.

The plan will outline the steps and processes needed to prevent or minimise damage to the environment through the use of machinery and equipment.

Earthmoving Plant and Equipment - Selection and Inspection

Once you have confirmed your job requirements you need to choose the right equipment and attachments to get the job done.

When choosing equipment you need to think about:

- The task requirements, specifications and goals.
- The appropriateness of the equipment for the completion of the task.
- The characteristics, correct use, operating capacity and limitations of each item.
- The potential risks to yourself and others in the intended use of the equipment.

Information about technical capabilities and limits can be found in the operator manuals supplied by the manufacturer of each item.

It is not safe to operate plant, equipment or attachments outside site procedures and the manufacturer's specifications. This may cause the machinery to break and could also cause an accident or injury.

Front End Loader – Characteristics and Limitations

Check the operator's manual and manufacturer's specifications for information about:

- Load limits and operating capacities.
- Balance requirements with and without a loaded bucket.
- The limits on slopes that can be negotiated both loaded and unloaded.
- Manoeuvring capability, such as turning radius and stopping distances.
- Use of slings.
- Materials and handling requirements

There are a range of attachments and equipment that can be fitted to the Front End Loader, including:

- Scarifier
- Ripper
- Auger
- Buckets
- Sweeper Broom
- Forks

When selecting an attachment, you have to work out if it is suitable for the tasks you need to complete by confirming:

- What the attachment is designed for.
- If it is an approved attachment that can be used with the front end loader you are operating.
- The manufacturer's requirements for the attachment.
- That you know how to use the attachment properly.

You will find this information in the operator's manual for the front end loader and the operator's manual for the attachment.

Fitting and Removing Front End Loader Attachments

Once you have decided that the attachment is right, you need to attach it securely using approved attachment points and methods.

Each attachment will have its own requirements for how and where it is fitted on the front end loader. You can find this information in the operator's manual or manufacturer's instructions.

Make sure you take appropriate safety precautions (such as releasing hydraulic pressures where needed) before fitting or removing attachments.

To fit an attachment:

1. Collect any required tools or equipment.
2. Make sure the front end loader is safely parked and correctly located for attaching the equipment.
3. Follow manual handling procedures – attachments can be heavy and awkward to manipulate.
4. Connect the attachment using the manufacturer's guides and ensuring all connectors are correctly joined.

To remove an attachment:

1. Collect any required tools or equipment.
2. Ensure the front end loader is safely parked and removal of the attachment will not cause a hazard.
3. Ensure any pressure couplings have the pressure released before detaching.
4. Disconnect connectors in correct order and using recommended safety procedures.

Conduct Routine Checks

Before you use any piece of plant or equipment, you need to conduct routine checks to make sure it is safe to use.

Make sure you are wearing the correct PPE before you start checking the machine.

Check the machine logbook before you start your inspection to see if there are any faults that still need to be fixed before you can use the loader.

Routine checks are made up of:

Pre - Start Checks → Visual checks that are made before you start the plant.

Operational Checks → Checks of all functions once the plant has been started.

Routine checks are performed at the start, during and end of each shift. You can use an inspection checklist to keep a record of the checks you have made.

Pre – Start Checks

Walk around the machine and look for anything that is out of the ordinary.

Part / Component	What to Check
Structure	• Check the general condition of the machine, including any loose nuts or bolts. • Check for oil or other fluid leaks. • Check for any signs of visual weaknesses, damage, stressed welds or paint separation. • Make sure a Roll Over Protective Structure (ROPS) and a Falling Object Protective Structure (FOPS) are fitted to the loader. (generic? – from LL TM)
Tyres	• Check the condition and air pressure of the tyres to make sure they are within the manufacturer's specifications. If the loader has water-filled tyres check the pressure with the valve at the top of the wheel.
Bucket	• Check the bucket for worn or broken components e.g. teeth, blade, bolts. • Inspect the hydraulics and connections for wear and tear. • Check the condition of the pivot pins.
Safety Pins	• Check safety pins are in place where needed and loose bolts are tightened. Also check keeper plates and pins are in place.
Power Arms	• Make sure you check the power arms for damage or defects, but be careful not to put yourself in a position where you could be crushed if there is a malfunction. • If you find excessive wear in the power arms and connections that make the machine dangerous, follow the tag out procedure and report it to your Supervisor.
Fluids and Lubrication	• Check that the oils (engine, transmission, hydraulic) and fuel are at the right levels. • Check that the water or other approved coolant is at the right level. • Transmission fluid needs to be checked in accordance with the manufacturer's specifications. • Check that parts are lubricated to ensure smooth operation.
Engine	• Check condition and security of battery. • Check electrolyte levels. • Check for any obvious signs of damage or wear.
Hydraulic Rams, Hoses and Piston Rods	• Hydraulic rams and pressure hoses are checked for splits, leaks, fractures, bulges and bent piston rods.
Decals and Signage	• Check that all decals and signage are present on the machine.
Windows	• Check that the windows are clean and you have good visibility from the operator's chair.
Cabin	• Check that the seat and safety belt are in good condition. • Check that the cabin is clean. • Check that the floor plates are free from grease and oil.
Service History and Logbook	• Check the machine hour meter, computer and instruments, manufacturer's recommendation and logbook to find out if the loader needs to be serviced.

For exact details on the components for the machine you are operating, check the operator's manual as different brands may have different requirements.

Operational Checks

Operational checks are made once the engine is started:

- Climb into the plant using 3 points of contact at all times.
- Never jump from the mobile plant.
- Adjust the seat until comfortable and make sure you have maximum visibility.
- Secure your safety belt or bar.
- Make sure all holding brakes/Hydraulic lock outs are on and the plant is in neutral gear.
- Start the engine following the manufacturer's instructions
- You will need to let the engine idle for the required amount of time.
- Always make sure your seat/safety belt is on and attachments are raised before moving off.

Controls and functions that need to be checked and tested on the plant:

Part or Function	What to Check
All Controls	Test all arm and bucket movements.
Switches and Gear Buttons	Check the master switch, isolation switches and start switch or key. Test gear change buttons or quick shift arrangements.
Gauges and Instruments	Check that all instruments are displaying properly and are not signalling any alarms or warnings.
Safety Devices	Test all lights and other warning devices.
Travel, Turning and Brakes	Test all movements and brakes, including the emergency stopping device.
Ancillary Equipment	Test all communications devices and any other systems or functions fitted, e.g. air-conditioning, radio, two-way radios, lights.

Once you have finished your operational checks it is a good idea to check for external signs of oil or fluid leaks.

Checking and Testing Attachments

Once the attachment is fitted, it is necessary to test it to ensure the correct fit, that it is secure, and that the attachment will function as required. This is to ensure the attachment will not break or become unsafe during use or operation.

The testing procedure for each attachment will be outlined in the operator's manual for the machine or in your site procedures.

To test for correct fit and use, turn the machine on and operate the attachment controls to the full range of motion for that attachment.

Always test attachments in line with safe operating procedures and referring to the machine and attachment Operator Manual.

Checking attachments should include:

1. **Visual inspection.**
2. **Physical inspection.**
3. **Check the hydraulic hoses for any bulges or unexpected lumps.**
4. **Check the controls to manoeuvre the attachment.**
5. **Check warning lights and alarms.**
6. **Check that the attachments are authorised.**

Recording and Reporting Faults

Once all routine checks are finished, you will need to report any problems, faults, defects and damage that you found during the inspection so that they can be repaired and the machine and equipment are safe for you or the next operator to use.

Make sure the plant is tagged out (isolated from use) until the repairs have been made.

Record the details of the problem in a fault report or the plant logbook.

Earthmoving Plant Operation

During operations you will need to:

- Assess the materials you are working with.
- Use the equipment safely and the tasks it is specifically designed for.
- Continuously monitor and check for hazards.

Consultation

It is important to coordinate and communicate your activities with other workers to make sure everyone knows:

- The work being completed.
- How, when and where you will be operating.
- What they need to do.

All workers on site must understand their own role and the roles of others before starting work.

Workers you may need to coordinate with:

- Supervisors and management.
- Other plant and vehicle operators.
- Traffic controllers or other workers.
- Team leaders.
- Site safety personnel.
- Maintenance workers.
- Contractors and site visitors

Assess the Materials to be Shifted

You will need to assess the materials you are working with to figure out the best way to handle it. For example, clay is more cohesive and harder to excavate than topsoil.

There may be different types of materials being handled at the worksite. They may include:

Material	Description
Clays and Mud	Clay and mud can tend to be dense and sticky and may not discharge cleanly if wet or damp. Sometimes, particularly with damp materials, the dump process may be longer than normal. Mud can purge from the front end loader, rather than discharge smoothly.
Topsoil and Organic Materials	Generally, these types of materials are loose and will dump cleanly. As topsoil can be reused in re-vegetation activities, it will normally be dumped in a quarantine area to keep it free from contaminants. It may be necessary to clean down the machine before starting work in other areas or prior to hauling topsoil or organic matter to prevent contamination.
Stones, Rocks and Gravel	The operating techniques needed will depend on the type of rock, and the size of gravel and stones. For example: ◆ **Metamorphic** rocks are heavy and hard. ◆ **Igneous** rock is volcanic and can be hard but may also be very light. Igneous rock can be very abrasive and may cause damage to the front end loader or wear down ripping points quickly. ◆ **Sedimentary** rocks and shale could peel out when cut and removed.
Silts and Sands	Depending on the amount of moisture, silts and sands can move cleanly and easily or can be difficult because of the fine and sometimes crumbly nature of the materials.
Construction Site Materials	Construction site materials can be blended materials, bituminous mixes and waste materials. How these materials handle will depend on the properties of the materials and the environmental conditions such as the moisture levels.

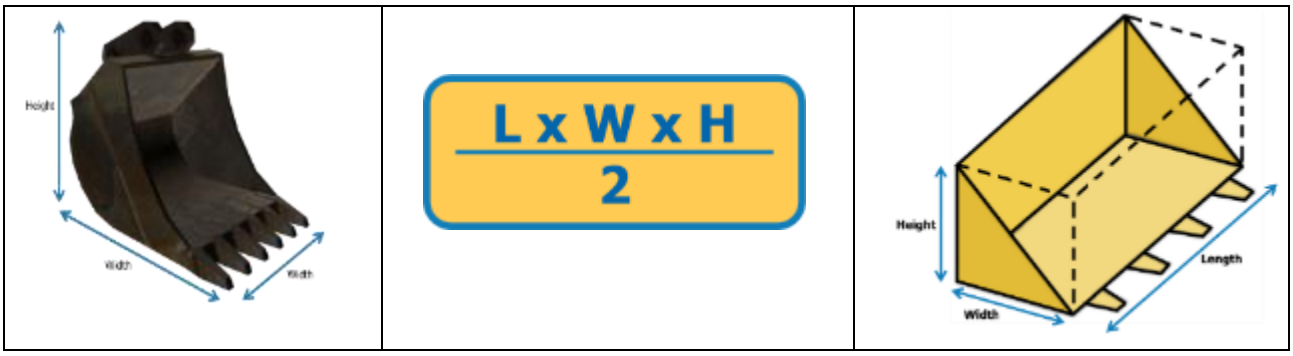
Knowing the material and how it reacts during operational activities is essential in order to complete required tasks efficiently and achieve optimum output.

You will also need to assess the weight of the materials you are working with.

Material	Weight per Cubic Metre	Material	Weight per Cubic Metre
Bronze	8.5 t	**Lead**	11.4 t
Clay	1.9 t	**Lime** (stone)	2.6 t
Coal	864 kg	**Sand** (beach, dry)	2.0 t
Concrete	2.4 t	**Sand** (beach, wet)	2.3 t
Earth	1.9 t	**Sand** (river, wet)	1.5 t
Granite	2.6 t	**Shale**	2.6 t
Gypsum	2.3 t	**Terracotta**	1.8 t
Iron Ore	5.4 t	**Zinc**	7.0 t

Think about the size of the bucket you are using and work out the weight of the load.

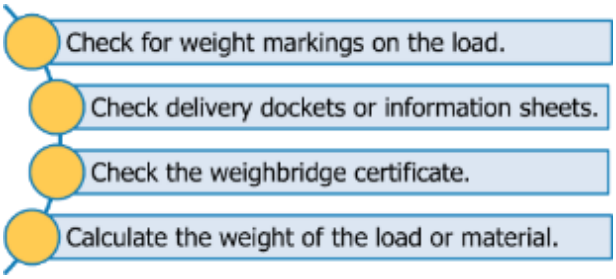
To work out the volume that the bucket can hold multiply the **height (H), width (W) and length (L), then divide it by 2:**



Check the weight of the materials against the manufacturer's specifications to make sure you don't overload the front end loader. Keep in mind that uneven, rough, boggy or sloping ground can all reduce the amount of material that the front end loader can safely carry.

Determine the Weight of the Load in Coordination with Other Personnel

The weight of the load can be established in a number of ways:



If you cannot be sure of the weight and cannot calculate it, do not lift or shift the load.

Once you know the weight of the load you need to make sure the plant has the capacity to lift it safely.

If you are using an attachment to lift the load you need to check that it is also rated to be able to lift the load.

Soil Technology

Characteristics of the materials being moved or loaded will affect your work.

You need to understand the basics of soils, clays and other materials so you are able to:

- Know how to best respond to them and handle them.
- Achieve the best outcomes in your work.
- Calculate load amounts.
- Understand conditions for moving the materials.

Safe Operating Techniques

To make sure your work is done in a safe way it is important to follow some basic safe operating techniques.

- Ensuring that you have read the operator's manuals prior to use.
- Make sure the mobile plant is suitable and positioned correctly for the ground conditions and that the bucket is suitable for the work requirements.
- Always keep to safe driving speeds and altering techniques to different conditions, material, terrain and follow approved haul roads.
- Always travel with the bucket as low as the ground conditions will allow.
- Keep in constant communication with other personnel.
- Continuously monitor and check for hazards and warn personnel if there is danger.
- Abiding by communication protocols and emergency procedures
- Report your progress on a regular basis and modify your work to meet any new project or quality requirements, or changing conditions.
- Recognising and reporting defects or problems.
- Ensure that the space is adequately ventilated and that you are using an approved exhaust control unit Scrubber/Catalytic convertor.

Spend the time to work out:

- Engine rev performance.
- What speeds are appropriate for which tasks.
- At what height the bucket performs best.
- Other factors.

Safe Plant Operation

One of the best methods for developing operational techniques is to ask a more experienced operator to mentor you.

Due to the high and shifting centre of gravity of mobile plant, you must be able to adapt to different terrain conditions.

Operators will usually use the following techniques:

- Excavating, loading and transporting materials
- Mixing materials
- Stripping or spreading topsoil and materials.
- Cutting, boxing and levelling
- Backfilling.
- Site clean-up.
- Maneuvering and attachment operations

Driving to the Work Area

Check that the route and direction of travel is clear – check over both shoulders before reversing.

If a reverse warning device is not fitted, sound the horn twice before moving off.

Raise the bucket smoothly and keep it at a safe travelling height (as low as possible) while moving to the work area.

Travel directly up or down a sloping surface, not across or diagonally down. This will ensure the loader is as stable as possible.

Avoid side hill travel where possible and be aware of open edges/ trenches.

On approach to downhill or uphill travel, reduce speed and choose an appropriate gear for the grade.

During downhill travel always use a low gear to help control the descent. Often this is the same gear that would be used to climb the hill.

Take care when changing gears during uphill travel, especially when in a heavy loader. If you miss a gear you could lose control of the loader. If the plant does not have enough power to climb, reverse back down and choose the correct gear to climb the hill.

Do not ever coast (put into a neutral gear and roll) the loader down a hill.

General Driving and Manoeuvring

- Keep clear of holes and soft areas.
- Travel downhill in gear and do not travel across steep slopes.
- If operating a Backhoe, turn the seat to face the direction of travel of work.
- If you are tired, sick, medicated or have drugs or alcohol in your system – don't drive.
- Do not carry passengers.
- Have the bucket close to the ground.
- Room and space for movement are often limited but techniques can improve with practice.
- Look out for other plant, structures, stockpiles and roadways.
- Be familiar with the worksite and your work area.
- Know the limitations of machine.

Talk to other operators about tips for improving operation and manoeuvring.

Braking

Braking techniques include:

- Have machine sympathy
- Don't brake too suddenly unless in case of accident.
- Allow enough distance to stop, particularly with a loaded bucket.
- Don't put the machine off balance when braking.
- Watch out for braking while turning, especially if locking brakes are fitted.
- Read the operator's manual – know your machine's capabilities.

Safe Operating and Travel Speeds

While operating the plant make sure movements are smooth, not jerky, and that you operate the plant at a safe speed and according to workplace procedures.

Operating the plant too fast can cause instability. Types of attachments fitted also have an effect on plant movements.

Going too fast will reduce the stability and control of the front end loader, as well as putting yourself and other workers in the area in danger.

Your speed may be affected by a range of factors including:

- The age of the machine.
- The work environment.
- Ground conditions.
- The type of tyres fitted.
- Visibility.
- Site rules. Policies and procedures.
- Amount of traffic, other vehicles or obstructions in the area.

The operator's manual will outline the limitations of the mobile plant you are using.

- Safe operating speeds and techniques.
- Safe travel speeds.
- Monitoring systems and alarms.

Excavating, Loading and Transporting Materials

Excavation is an important step in a lot of projects because it prepares the site for future work.

Make sure you work safely and follow the work plan including:

- Checking for underground services (power, telephone, gas, water, sewer, drainage and fibre optic cable lines) before starting to excavate. Talk to the site supervisor who will contact the supply authorities for council maps of the site.
- Checking state or territory standards for safe operating distances from power lines.
- Using barricades, guard rails or fencing and warning signs to prevent workers falling into a trench or vehicles and machines getting too close. No workers should be standing within operating radius of your loader while you work.
- Use attachments within the manufacturer's design limits.
- Don't overload the bucket – make sure you work out the capacity of the bucket and assess the material to be loaded.
- Don't undercut a bank or stockpile as it could collapse and the loader could overturn.

Excavating and loading with a Front End Loader/ Skid Steer is done by driving the bucket into the materials and scooping them up. This can include cutting into the ground or loading materials from a stockpile.

Excavate slowly towards any underground services.

When excavating you should check for signs that you are getting close to a previous excavation or an underground service. If you notice any of the following signs, stop operating immediately and hand dig to investigate:

- Crushed blue metal or plastic tape.
- Clean sand or sand bags.
- Broken tiles.
- Moisture.
- Any other unusual material.

If cutting a trench across a footpath:

- Gather information and permits from relevant authorities who may run services under the footpath.
- Excavate slowly towards any underground services.
- Set barricades and signs to isolate the area.

If you are excavating a trench, deposit full buckets of material away from the trench. Loads should be placed at least 1m away with material coming to rest no closer than 0.5m from the excavation.

Travelling with the Load

Some points to remember when travelling with a load:

- Constantly monitor the load as you drive.
- Always travel with the bucket as low as possible and tilted back for greater stability and vision and less spillage.
- Keep the machine balanced.
- Try to avoid spillages.

Loading Materials into Trucks

When loading trucks, it is important that you know where the driver is and coordinate your approach with them. You don't want to accidentally run into them.

- Approach the side of the truck slowly once it has stopped in position.
- Never load over the cabin of the truck as the bucket could hit the cabin or load could drop onto the cabin.
- Make sure you know where the driver is at all times.
- Avoid contact with the truck by leaving enough room to raise the bucket.

- Once the bucket is high enough you can move in closer and roll it forward to deposit the load into the truck.
- Keep a safe operating grade when placing a load.
- Place a layer of soil in the truck to take the impact of large rocks.
- Constantly keep sight of the load that you are discharging.
- Be careful of large boulders tipping out of the bucket onto the truck.
- Ensure correct braking (or use of hand/load brake) to stop movement if applicable.
- Minimise spillage and carry loads low to ground where possible.

Make sure anyone in the area is at a safe distance from loading operations and that they stay within your view.

Mixing Materials

The bucket can be used to mix materials in a stockpile.

The bucket is used to first slowly drag the materials from the stockpile out and spread them along the ground. The materials are then collected up by the bucket and returned to the stockpile.

Other materials can also be added during the mixing process if required.

A tiller attachment is useful for this kind of work. You can use one to break up the ground and mix topsoil or clay with other materials to prepare the ground for future work.

ippers and scarifiers can also be used to break up the ground before mixing materials.

Stripping and Spreading Topsoil

Mobile plant can be used to strip back the top layer of earth to excavate or level an area.

The blade of the bucket is used to cut and lift a small amount of the topsoil.

This topsoil can be transported to another area and spread out.

Spreading topsoil can be done by:

- discharge the soil from the bucket bit by bit as you move along
- scrape a small pile of topsoil over an area using the blade of the bucket or a 4-in-1 bucket.

Levelling

Levelling with the front end loader is performed by having the bucket placed flat on the ground and the machine move backwards, dragging the bucket or moving forwards, pushing the bucket.

It is important to remember the following points:

- Work to the designated grades in the required manner. This will include the type of levelling, the grade and slope, and the fall (for water to shed off).
- Levelling information and procedures will be discussed during your task briefings.
- In many cases GPS and laser control systems are now used to provide a more accurate finish to the work. This eliminates the need to have a person standing close by ready to take levels (although this may still need to occur with some works).

Levelling equipment needs to be calibrated regularly and checked against site reference points such as pegs, benchmark points or other defined levels.

Cutting and Boxing

Cutting involves cutting or removal of material above a required level i.e. cutting down to create a floor or design level.

Boxing is the technique of removing materials below a level and may involve trenching, or removing sections of pavement in a “box” type shape to a desired level.

More efficient plant used for these techniques are the Excavator and Backhoe. Loaders and Skid Steers can be used but aren’t ideal.

Stockpiling

Front end loaders are used to either create stockpiles by placing materials into the pile or to empty a stockpile by removing materials.

Do not undercut a bank or stockpile, as it could collapse and cause the front end loader to overturn and trap the operator underneath.

Backfilling

The mobile plant can be used to backfill trenches or small excavations after work has been completed.

When backfilling make sure that you do two things:

- Check that the right materials are deposited into the excavation.
- Check that the right level of compaction is achieved.

Loose materials in a trench or excavation can settle over time and sink down. Make sure there is enough material packed into the trench to keep the ground even after the work is completed.

When using a Front End Loader or Skid Steer, always approach a trench square-on (form a 'T' with the trench) and take care when working near the high side of the trench or on soft or sloping ground.

Trenches over 1.5m must be shored to prevent collapse. This is required if people will be working in the trench area or alongside.

Site Clean Up

Mobile plant is useful for cleaning up worksites after major works have been completed, or preparing sites for other work.

Site clean-up includes removing unwanted materials from the area. You may need to stockpile them for later use, or deposit them in an area where they can be removed from the site.

Monitoring Systems and Alarms

Each machine has its own set of alarms, monitoring systems and gauges to help you safely and efficiently operate it, and warn you if something is wrong.

Each make and model of the same type of machine can be different so it is important that you are familiar with all of the systems for the equipment you are using.

Check the operator's manual for a full list of devices, alarms and warnings.

Here are some examples of the gauges and warning systems that may be found:

- Engine oil pressure.
- Engine temperature.
- Hydraulic oil pressure.
- Hydraulic oil temperature.
- Electrics.
- Fuel.

Generally, alarms and warnings fit into 3 categories:

Warning Type	Description	What You Should do
Category 1	Machine needs some attention, but it is still safe to operate.	Keep operating as long as it is safe to, and report the problem.
Category 2	There is a problem caused by the way you are operating that may lead to further problems.	Change the way you are operating. If not fixed, stop operating and report the issue.
Category 3	Most serious warning. Continuing to operate will cause damage to the machine.	**Stop operating** and shut down the equipment immediately. Report the problem.

Using Attachments

You need to know and understand the operational limits of the equipment you are using to make sure you don't damage it, or put yourself in danger.

- Each attachment has been designed to do a specific type of work, for a specific type or range of materials.
- Do not ever use an attachment for any job other than the one it is designed for.
- Make sure you have enough room to operate the attachment safely without putting other workers in danger.
- Check the manufacturer's specifications or instructions for information. It is important that you follow the recommendations and the design limits for attachments, as this will guide you in using attachments safely and efficiently to achieve the desired results.
- Keep all operations within the limits and capabilities of the equipment. You could damage the attachment if you push it too hard.
- After you have finished using the attachment, check your work to make sure it matches the plan.

Adjust Techniques to Meet Changing Conditions

While you are working and moving materials, the site will change.

Lighting Changes

Twilight is the time when your eyes might become more tired and difficult to focus. It could be more difficult to see the terrain and to judge distances. Set up temporary lighting where possible and go slowly.

Weather Conditions

Rain, sleet, snow, wind and humidity can all affect both your loader and the materials you are working with.

Additional moisture from any source will change the composition of the materials, possibly making them heavier and slippery. This means you will not be able to lift or haul as much and you will need to adjust the quantities you are dealing with in each load.

Changing Work Conditions

As more materials are moved around or removed from a site the work conditions may change.

Materials that you are working with can change throughout a project.

As you excavate deeper or move onto other stages of the civil construction project such as landscaping or preparing road base you will be working with different materials, attachments and personnel.

Lift, Carry and Place Loads Using Lifting Gear

In civil construction projects you may need to use mobile plant to lift and carry loads using slings and lifting gear, for example lowering pipes into trenches.

It is important that this work is conducted in coordination with authorised personnel such as a licensed dogger or rigger.

Determine the Weight of the Load

You need to coordinate with authorised personnel to work out the weight of the load to make sure your loader can safely lift it without damaging the equipment, attachment or making it unstable.

The weight of the load can be found in a number of ways:

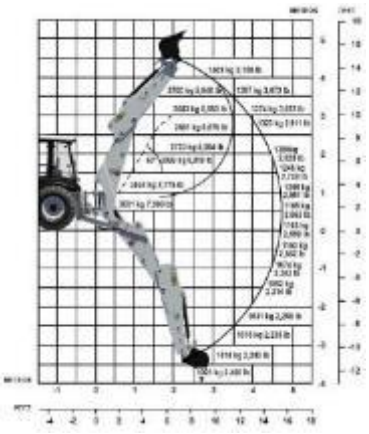
- Check for weight markings on the load.
- Check delivery dockets or information sheets.
- Check the weighbridge certificate.
- Calculate the weight of the load or material.

If you cannot be sure of the weight and cannot calculate it, do not lift the load.

Once you know the weight of the load you need to make sure the loader you are using has the capacity to lift it safely. You can check the capacity of the loader in the operator's manual or manufacturer's specifications.

If you are using an attachment to lift the load you need to check that it is also rated to be able to lift the load. Keep in mind that using an attachment may also reduce the overall capacity of the loader.

Load Charts

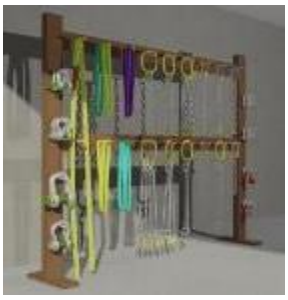


Always check the mobile plant load chart to make sure that any load that is lifted is within the capacity of the machine.

Pass on any information about machine and equipment capacity to the person slinging the load.

Using the front bucket on a Backhoe for lifting should only be done if using a bucket attachment that is specifically designed for lifting (has an approved and rated lifting lug).

Choosing Different Types of Lifting Gear



When using the backhoe/loader for lifting, make sure it is fitted with the correct lifting attachment or that the machine has the appropriate lifting lugs.

Always use an approved lifting lug or lift connection that is clearly marked with the Safe Working Load (SWL).

Lifting gear needs to be selected based on the type, size, weight and shape of the load to be lifted.

Only a licensed dogger or rigger is authorised to select and inspect lifting gear, determine the weight of loads and select and apply slinging techniques

Lifting gear that may be used with the backhoe/loader includes:

- Wire rope slings – also known as Flexible Steel Wire Rope (FSWR).
- Chain slings.
- Synthetic slings.
- Eye bolts, shackles and hooks – used to attach lifting gear to the load and backhoe/loader.

Each piece of lifting gear is rated to a specific capacity known as a Working Load Limit (WLL).

This WLL can change depending on how the lifting gear is connected and arranged. This is why a licensed dogger or rigger needs to decide what lifting gear is being used and how it will be used.

Inspecting and Connecting Lifting Gear

Slings and other lifting gear must be inspected before and after use for any signs of damage or wear. All faults must be reported in accordance with site procedures and the equipment must be isolated (removed from service).

Once the correct attachment and lifting gear has been chosen and inspected by a licensed dogger or rigger, you need to make sure it is connected to the front end loader properly. Slings should only be attached to manufacturer approved lifting lugs using a shackle that is rated to lift the load.

Remember: Only a licensed dogger or rigger can select, inspect and apply slinging techniques and determine the weight of loads. You may only participate in these activities under the direct guidance of a qualified dogger or rigger.

Positioning the Mobile Plant for Lifting

Before lifting a load with slings, you need to get the plant into the right position. Make sure:

- The front end loader is on firm level ground.
- The load, plant and lifting gear can all be safely accessed.
- Any other personnel, plant and equipment not directly involved are a safe distance away.
- You have enough overhead clearance to lift the load.
- You have enough room to move once you have lifted the load, especially if you need to travel with it.
- The plant is in line with the load so it will not swing when it is lifted. This could include being at a 90 degree angle to the excavation area.
- You have a clear line of sight to the excavations and areas you will be lifting loads into.
- You have enough swing room to operate the plant safely.

Lifting Techniques

Follow these guidelines whenever using the backhoe/loader to shift a load using slings and lifting gear:

- Follow directions from the dogger to position the lifting point over the centre of gravity of the load to keep the load from swinging.
- When you are given the signal perform a test lift then lower the load again so that any changes to the slings and load can be made.
- Keep all movements smooth and slow.
- Stop the lift immediately if the weight of the load causes the machine to tilt or if the hydraulics begin to strain.
- Loads should be moved the shortest distance possible to maintain effective and efficient control of the machine and the load.
- Constantly monitor the load during any moving activities.
- Keep the load as low as safe and practical if travelling with the load, ensuring the load swing zone is clear
- Monitor your speed of travel and stay within safe speed limits.
- Maintain a safe distance from exposed edges.
- Follow all hand signals or other designated signals.
- If the slings shift on the load being lifted stop the backhoe/loader, warn workers in the area, carefully lower the load and have the slings re-positioned and secured.
- Make sure that if lowering objects such as pipes into trenches that the trench is shored and workers are standing a safe distance away.
- Land the load at the designated location. Ensure that it is secure and stable.
- Make sure lifting equipment is properly detached before moving off.

Communication when Lifting and Moving Loads

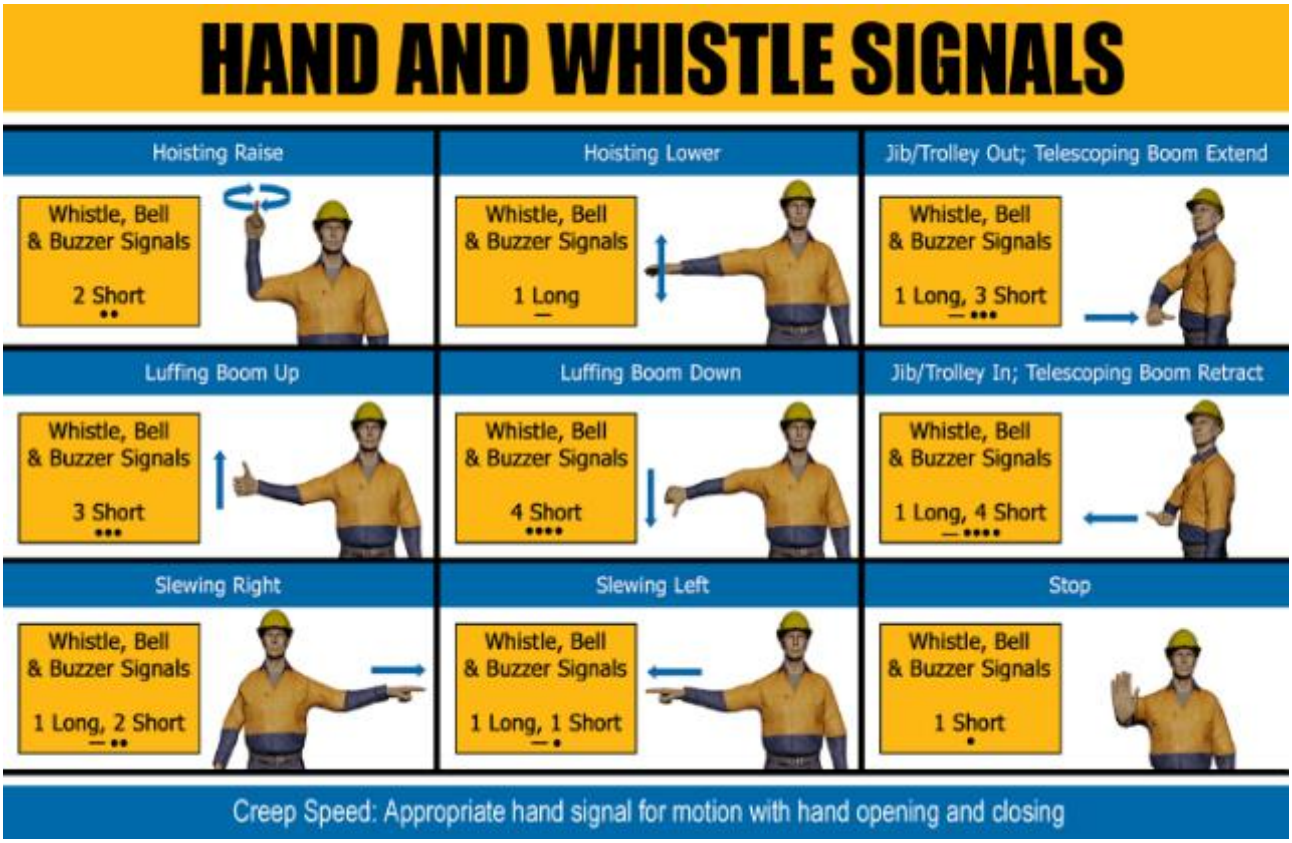
Communicating when transporting and lifting loads may involve communication using the following equipment / techniques:

- Hand signals
- Two way radio
- Whistles, bells or other devices

Hand and audible signals are designed to make the lifting and placement of objects safer and more effective.

Make sure you confirm all signals with the dogger who is directing you before you start to shift the load.

Make sure you follow all directions given to you by the person who is directing the lift.



Monitor and Check for Hazards

While you work it is important to always be on the lookout for new hazards, and to check that hazard controls are still in place and working effectively. This will help to ensure the safety of yourself, other personnel, plant and equipment.

Check the following things while you work:

Overhead Power Lines, Structures and Clearances

Know how far you are from overhead power lines at all times. Use a spotter to guide you if you cannot clearly see.

Be aware that the distance to the overhead services may be reduced as ground conditions change or stockpiles are created.

You also need to be aware of overhead clearances when dumping materials into trucks or other haulage units.

Other Machines

At all times you need to know when other machines are working near the front end loader. Good communication between operators is essential to avoid collisions.

Live Stockpiles

Movement of materials in a live stockpile is likely. There is always the potential for the walls of a stockpile to collapse if it is incorrectly excavated.

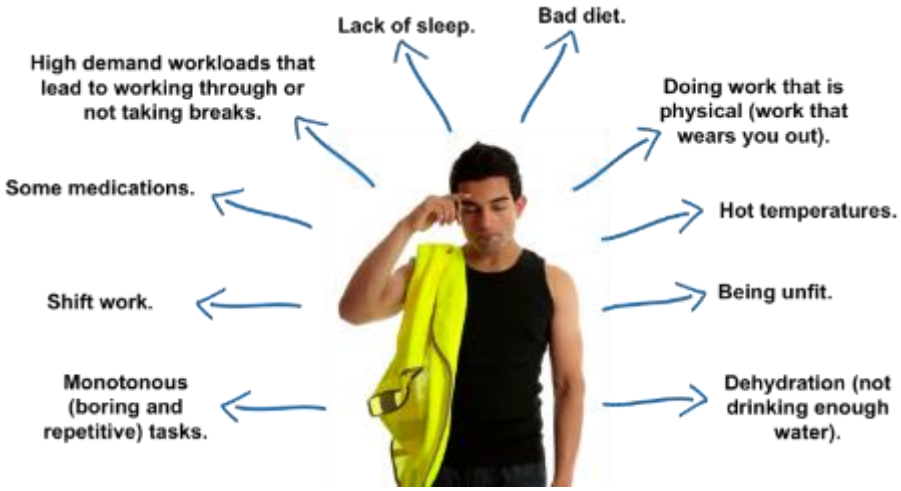
Personnel

Good communication is the key to working with other personnel. Be aware of people in the work area. Make sure they are not in danger and are a safe distance from the front end loader. If you are authorised, tell them to leave if they shouldn't be there, or call on someone who is authorised.

Operator Fatigue

Fatigue is one of the leading causes of accidents for operators of all types of vehicles and equipment.

Fatigue can be caused by:



Warning signs that you are suffering fatigue include:

Category	Possible Signs of Fatigue
Physical	◆ Slow reaction time. ◆ Tiredness, yawning or sore eyes. ◆ Headaches, stomach or other problems. ◆ Micro sleeps (nodding off for a short period of time).
Mental	◆ Trouble concentrating and thinking clearly. ◆ Shorter than normal attention span. ◆ Boredom, irritability or lack of motivation.
Work	◆ Poor or careless performance. ◆ Overlooking minor but potentially important details. ◆ Lower levels of communication and cooperation with others.

It is very important that fatigue is managed properly. Here are some ways you can manage fatigue:

- Get enough sleep.
- Drink plenty of water.
- Take regular breaks.
- Keep a healthy diet.
- Keep a reasonable level of fitness.

Reporting Hazards

Any hazard or environmental issue that you identify during your work will need to be reported. If you have taken any action you will also need to report those details.

Your worksite may have standard paperwork that needs to be filled out, for example:

- Hazard report forms.
- Work method statements.
- Other reports or documents.

Checking Completed Work

Once you have completed your work you will need to check it against:

- Your work instructions and project plans and drawings.
- Project quality requirements and timelines.

Speak to your supervisor when the work is completed to see if there are any other tasks that need to be done to complete the job.

Conclude Operations

Once all tasks are complete and the work for the day is done, it is important that you park and shut down the plant.

Every piece of machinery has slightly different park and shutdown procedures. For the exact procedure for the machine you are operating, check the operator's manual.

Parking the Mobile Plant

The plant needs to be parked in a safe way that will allow easy access to the vehicle.

Safe parking practices include:

- Stop the plant on a flat level surface in the designated area and keep the access points clear.
- Park the plant away from overhangs, excavations, access ways and tidal or flood areas.
- If the plant must be parked on a sloping surface it should be facing across the slope.
- Keep the plant away from refuelling sites and areas when parking or you can block the rest of the machines on the site from accessing fuel.
- Apply all locks and brakes.
- If the plant has to be parked on a public access way, lights, signs and barricades should be erected to warn people.

Shutting Down the Mobile Plant

Shut down procedures include:

- Cooling of the engine before shutting it down. This is usually the same amount of time as the engine warm up time.
- Monitoring the controlled lowering of temperatures and pressures.
- Walking around the machine looking for any signs of damage or faults that may have occurred during the task.
- Any problems found during the post shift walk around need to be documented and reported
- Securing the backhoe/loader using any applicable lock out or isolation devices and removing the keys. This will prevent any movement of the backhoe/loader.
- Ensuring equipment is correctly stowed in accordance with site and manufacturer's requirements.

Post-Operational Checks

General maintenance activities are done to keep all plant and equipment working safely for longer.

You need to inspect your machine to find and report any faults or damage that may have occurred during your work activities.

Your inspection should include:

Visual Inspection	Looking for anything broken, damaged or out of place
Visual Inspection of the Environment	Is any fluid leaking?
Signals	Alarms, lights, electronic indications showing that something may be wrong
Gauges	Showing temperatures and the levels of fuel, oil and other fluids

Post-operational checks should include all of the things you look for when conducting pre-start checks. For example:

- Fluid levels.
- Condition of tracks or tyres.
- Visibility (windows and mirrors).
- Hydraulics (rams, hoses and connections).
- Structure and attachments for damage or wear.

Reporting Faults

Once a fault has been found, it needs to be reported and fixed.

Most sites have a fault report form that will need to be filled in with the details. The form will generally need:

- Front end loader or equipment make and model numbers, the
- site identification numbers,
- the type of fault and
- the person reporting the fault.

You also need to make sure the plant is tagged out (isolated from use) until the repairs have been made.

Some sites will have a verbal system of reporting where you speak with a supervisor who then documents the fault, while others may require the operator to organise repairs of the fault directly.

Mobile Plant Relocation

Prepare the Plant for Relocation

The plant will need to be prepared before it can be moved from site to site.

Some issues in moving the plant to another worksite may include:

- Cross-contamination between sites.
- Hazards from loose or detached parts.
- Movement of the plant in transit.

Before relocating the front end loader, you may need to do some or all of the following things:

- Clean the front end loader thoroughly.
- Clean any attachments going with the front end loader.
- Empty the fuel tank (if practical).
- Secure all moving parts.
- Remove and store any attachments going to the new site.
- Make sure all connectors are secure and locked.
- Lower the attachments to rest position and lock it into place or remove the attachment if needed.

Relocate the Mobile Plant

Mobile Plant can be moved on special trailers or on the back of a truck. Any transport must comply with:

- Codes of practice.
- Traffic management requirements.
- Site regulations.
- Traffic codes and road rules.

There is specific training to safely load and unload plant from vehicle trailers/ floats. Authorised people to load and un load mobile plant include:

1. A person who currently holds the competency for RIIHAN308F Load and Unload Plant (or its equivalent), or
2. A person who is being directly assisted by someone who currently holds the competency for RIIHAN308F Load and Unload Plant (or its equivalent).

When transportation is required, you will need to drive the machine onto the float. The safest way to do this is to use a spotter to make sure you are moving onto the float as straight as possible and that you stop in the right position to secure the equipment onto the trailer.

Once the equipment is in place on the back of the float, locking pins will need to be engaged and it will be tied down and secured onto the float.

A spotter would also be used when unloading the vehicle once it gets to the next location.

Clean the Mobile Plant

It may not be practical to clean the plant after every use but you should clean it thoroughly as often as possible. Mud and other contaminants left for long periods will eventually damage the machine.

Cleaning is also a good way to do an even closer inspection of the plant, and may highlight issues you didn't see during the walk-around inspections.

Cleaning will need to be done in a designated area to avoid any negative impact on the environment or contamination of the site.

Carry out Maintenance Tasks

Before carrying out any routine maintenance and minor repairs make sure you have all of the tools and equipment you will need to finish the job.

When conducting maintenance activities, it is important to keep people in the area safe by using barricades or fences if necessary and locking out machines.

Tasks should be completed within designated areas and others should be informed of what you are doing.

You should conduct servicing, maintenance and housekeeping tasks to ensure the loader stays at its operating capacity for as long possible.

Maintenance activities could include:

- Air filters – should be checked daily in dusty conditions. Clean or replace them as necessary.
- Checking bucket teeth and replacing them as needed.
- Battery checks – clean the battery, check electrolyte levels.
- Fuel and other fluids – check and maintain levels.
- Refuelling.
- Recording and reporting of faults through workplace procedures.

You will also need to coordinate with mechanics, maintenance supervisors or other site workers to ensure the vehicle is serviced at regular programmed intervals.

Vehicle Refuelling Procedures

All refuelling of equipment needs to be done in line with safety procedures and workplace instructions. Refuelling can be a dangerous activity, so it is important that you know and understand the correct procedures and techniques.

Some sites may have refuelling areas for plant and machinery set up to make sure any spills or incidents can be contained without causing damage to the environment. Spill response procedures need to be clear and spill kits available to manage any incident.

Other sites use a service truck or fuel tanker that travels to each machine to refuel. On these sites it is very important that all procedures are followed to avoid any incidents (such as fires in a coal mine environment) or damage to the environment. For example, there may be site rules against refuelling plant and equipment near a waterway or sensitive area.

These are some general guidelines for refuelling plant and equipment. Always check the procedure for you work site before any refuelling is done.

- Park the machine in an appropriate location or within a bunded area. This contains any environmentally sensitive fluids or spills from entering and causing damage to the environment.
- Shut down the machine and apply all brakes and isolations.
- Leave the cabin, or if company procedures do not allow this make sure you do not restart the machine until you have permission from the refuelling operator.
- If you are responsible for refuelling the machine, make sure you have the right PPE on before you start. This may include safety glasses, face shields, gloves or other approved gear.
- Activate the fuel pump correctly and make sure all safety procedures are followed.
- Shut down the fuel pump once the machine has been refuelled.
- Roll up or safely tidy all fuel lines or hoses.

Processing Maintenance Records

Most sites have workplace forms, logbooks or checklists for writing down details of all machine maintenance work. They are used to record the history of the machinery and equipment so that all operations and any problems can be monitored.

Written maintenance records for the plant may include:

- Inspection checklists, computer readings
- Fault reports.
- Fuel, oil, hydraulic and other fluid usage.
- Service manuals or logbooks.
- Repair request forms.
- Part requisition forms.

You will usually need to include details like the plant make and model number, site identification numbers, the type of maintenance carried out, the repairs or replacements that were done and the person who did the work.

Clean Up after Operations

Once all your tasks are finished, you will need to clean up the site. This includes removing any tools and equipment that have been used.

In clearing your work area you will be carrying out housekeeping activities. Housekeeping procedures on your site may include:

- **Eliminating or controlling any potential hazards.** Your duty of care means you shouldn't leave a possible source of danger or accident for others.
- **Using the correct PPE**. Make sure you use appropriate PPE when dealing with waste or possible hazardous materials as you clear up. For example, chemicals used for cleaning can be dangerous unless used correctly.
- **Removing any hazard controls that are no longer needed**, e.g. temporary fences, barricades and signage.
- **Recycling or disposing of materials to carry out site clean-up tasks**, e.g. construction materials, stockpiled materials, stones, rocks, gravel and bituminous mixes, paper and site rubbish. Put any waste materials in the bins provided, and recycle where possible, in line with the site plans for environmental management or waste disposal.
- **Packing up, maintaining and storing plant, equipment and tools.**

Good housekeeping will help you to see any problems or hazards on the worksite.

It is your responsibility to clean up after your work activities and not leave it to someone else to do.

Cleaning and Storing Attachments

Once the attachment has been removed it should be cleaned, checked or inspected for wear or damage and maintained and stored according to the manufacturer's instructions and site requirements. This will help to make sure that they are kept in good working order.

While you are cleaning attachments, check each item for damage, wear and tear or defects. If anything is wrong report it, repair it, or have it fixed by a qualified person.

Most equipment will have specified storage areas and requirements so make sure you know where and what these are before you detach heavy attachments. This will allow you to offload the attachment where it is meant to be and minimise heavy lifting or handling.

Be careful when you are cleaning and maintaining attachments. Some materials that you work with can become extremely hot and sticky, and could possibly burn through your clothing and skin. Use appropriate cleaning instruments and wear personal protective equipment (PPE) as required.

Most attachments will have designated storage locations as outlined in the site requirements.

Storage requirements could include:

- Must be stored in a padded hard case box – particularly with laser levels.
- Must be stored in particular environmental conditions such as a certain temperature.

Refer to the manufacturer's guidelines, operator's manual and worksite procedures for each item.

Process Written Records

Part of your role will include completing and processing records for your backhoe/loader and the tasks that you have completed.

As well as the maintenance records you have filled in, some other records, reports and paperwork that may be needed include:

- **Computer readings** – from process monitoring, test results, activity reports, and materials readings.
- **Logs** – supply logs, work activity logs, training logs, stockpile logs, usage or driver logs.
- **Shift documents** – end of shift, end of process, quality information.
- **Fault reports.**
- **Hazard reports** – including Take-5 forms.
- **Incident reports** – accident forms, incident reports, environmental incident reports, WHS investigation reports, quality assurance (QA) reports.

It is important that you keep detailed records of all your activities, especially any problems you had during your shift.

Make sure you keep notes about what happened and what you did to fix it. This includes faulty or broken equipment, operational issues (mistakes or not following procedures correctly for some reason) and any other unusual things.