
# Learner Guide

## Earthmoving Course

## RIIMPO323E Conduct Civil Construction Dozer Operations

## Learner Guide

National Courses PTY LTD

# 1.1 Introduction

## 1.1.1 Introduction to Dozer

A dozer is a self-propelled tracked or wheeled purpose designed machine with a blade mounted at the front end.
You use a bulldozer to move rocks, tree stumps and earth.
There are two types of dozers:

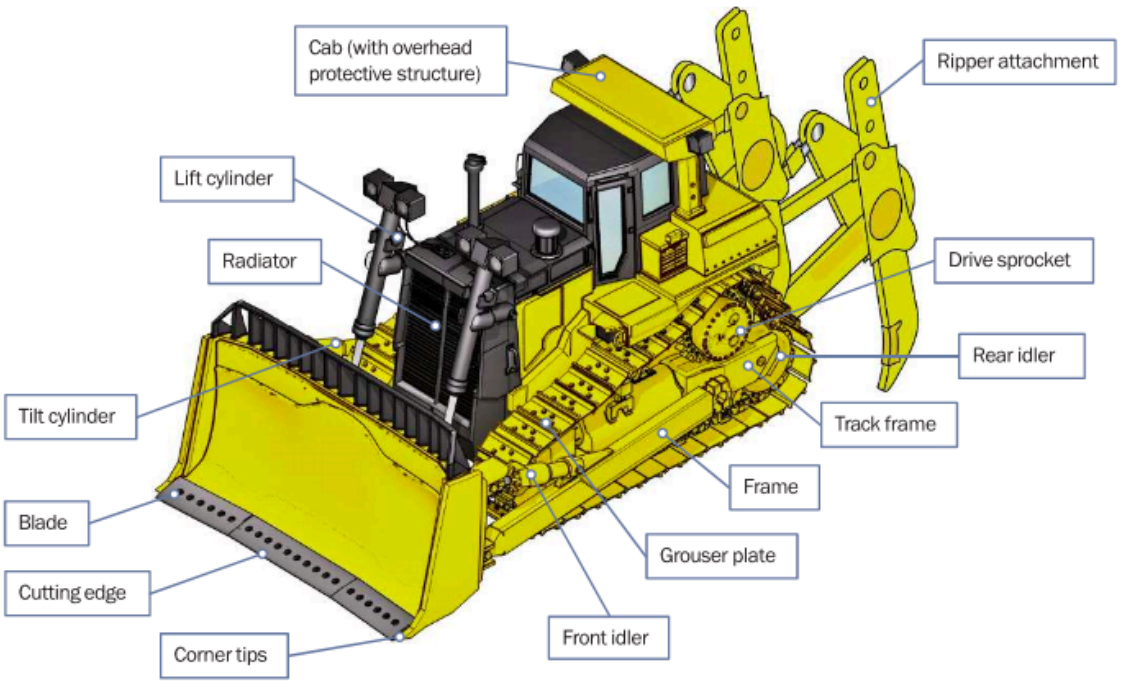
| | |
|---|---|
| **Tracked/crawler dozers** are the most powerful and compact. But, they are slow, tracks wear quickly, they can damage concrete and are more difficult to transport between jobs.<br>They are best to use on uneven and slippery surfaces because they have the best traction.<br>  | **Rubber tyre dozers** are four-wheel-drive and can articulate.<br>They are stable and comfortable on firm level ground but are not good in the mud.<br>  |

## 1.1.2 What Industries Do You Use A Dozer In?

- Civil Construction
- Quarrying
- Mining
- Waste

## 1.1.3 An Example of A Dozer

A dozer, also called a bulldozer, is a tractor with a blade at the front.The blade canlift up or down, tilt and rotate. You use a bulldozer to move rocks, tree stumps and earth.



# 1.2 The Basic Road of Construction

## 1.2.1 The Basic Road of Construction

| | |
|---|---|
| A surveyor will stake out the site according to the site plan. The stakes mark where the road will go and any drains or pits, which will help to drain water away from the road area.  | An excavator or dozer removes the trees, shrubs and other plants and levels the area. Some trees may be protected with padding or fencing.  |
| Sometimes contractors may use a borrow pit (also called a sand box). A borrow pit is an area where soil, sand or gravel (material) is dug out to be used in another area. Sometimes the borrow pit will become the drains, or water catchment areas at the end of the work.  | The excavator or dozer may use material from the borrow pit to build up low areas in the road. They may also build up diversion blocks. Diversion blocks divert water away from the road and into drains.  |
| As the operator shapes the ground, they will usually create drainage at the sides of the road area. They will also make sure there is enough fall (scope) on the road so that water drains away from the road.  | Drains are installed to help take water away from the worksite.  |
| A front end loader or dozer shapes the road base. This helps smooth out the surface ready for grading.  | A water truck may wet down the ground. This helps the soil to bond.  |

The grader grades the road to produce a much smoother surface.

A roller or compactor then compacts the road. This breaks up lumps and smooths the surface out.

A site supervisor or roller operator tests the compaction. Sometimes they will use a deflectometer or penetrometer. Some rollers/compactors can test the compaction as they drive.

Many layers of the ground material are built up. This is called the subgrade. Each layer is compacted and tested.

Trucks then deliver subbase. Haul trucks or tip trucks sometimes tip the subbase, and front end loaders spread it.

A water truck may spray water on the subbase to help the soil bond. This makes the particles stick together and make it compact better.

Several layers of subbase are laid. The subbase is compacted and tested.

Once the subbase is at the right thickness and is compacted properly, trucks deliver the course road base. The road base is built up in many layers. Water trucks may wet down the road base if it helps the roller/compactor compact the base.

When the road base is thick enough, and is compacted properly, the road is finished.

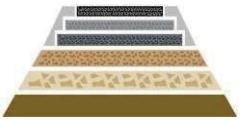
If asphalt is being laid, more layers will go on top of the road base. There will be an asphalt base course, then a binder course, and finally, a surface course.

Finally the planting, erosion control and drainage work is completed.

## 1.2.2 Principles of Soil Technology for Civil Works

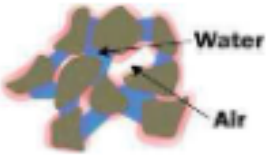
One of the most important jobs you will do, as a machine operator, is to help lay foundations. Foundations are the base for roads, railway lines, swimming pools and buildings. If you do not have a solid foundation, you cannot build something solid on top of it.

When soil is firmly compacted it has an increased density, this provides a stronger foundation to build on.

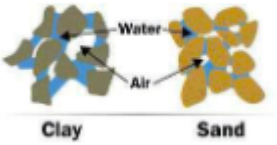


In civil construction, moisture content means how much water is in a soil, rock, aggregate or road base. Moisture is very important in earthmoving. Moisture affects the weight of soils. It makes soils swell, and it also affects the handling properties of the soil. Handling properties means how easy or hard it is to work with that soil.

The amount of water in soil affects its viscosity. Viscosity is how thick the soil is. For example dry loose soil has a low viscosityand is easy to work with. Wet muddy soil has a higher viscosity and can be more difficult to work with.

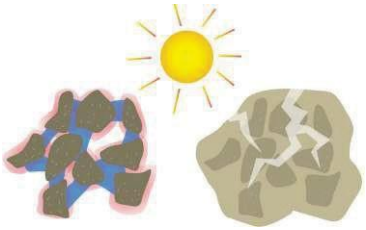


All soils usually contain moisture. How much moisture the soil has depends on many things. The weather, drainage, and the soil's ability to hold water all affect the moisture in a soil. Retention properties mean how much water a soil can hold. Different soils can hold different amounts of water. Sometimes you can treat a soil to change its moisture content. To do this you mix a chemical with the soil.




Different types of soils can cause problems with foundations. Wet, boggy soil can cause foundations to sink. That is why it is important to make sure water can run or drain from the site. It is also important that the foundation is built up to the right level. You can sometimes treat wet boggy soil with lime. Lime helps dry out the soil, and helps it 'clump' together.

Clay soils can also cause problems under foundations. This is because clay attracts water. When this happens, the clay expands and swells. Later, when it is hot and sunny, the water dries up and the clay cracks.



Over time, this swelling (expanding) and cracking (while shrinking) can warp your foundations. This can cause cracks and potholes in roads, cracked walls or ceilings in buildings, or swimming pools to crack and leak.

You can treat clay soils with chemicals that stop clay from attracting water. Once you treat the clay, you can compact it. This makes a much better foundation that won't swell and crack as much.

Before you use any chemicals, you must make sure they are safe. Check the safety data sheet (SDS) to find out how to safely use, store and handle the chemical. Check the site's environmental management plan. If you are not sure about using a chemical, talk to your site supervisor.

# 1.2.3 Operating Techniques

## 1.2.3.1 Building A Stockpile

A stockpile is a pile of material (soil, sand, rock, etc) that you use for earthmoving work. You must choose a good location for your stockpile. If you choose the wrong location, your stockpile could get washed away or become dirty (mixed with other materials).

| | |
|---|---|
| If you can, choose an area of well drained, firm level ground.<br>  | You should set up drainage so that rainwater does not cause the stockpile to wash away or slide.<br>  |
| Make sure the stockpile is close to the area you are working. You don't want to drive too far to work with the stockpile.<br>  | Make sure you have clear access to the stockpile.<br>  |
| Clear the area of any rubbish or debris, so it doesn't get mixed in the stockpile.<br>  | When you fill out a stockpile, start by filling the area closest to the back of the stockpile area.<br>  |
| Don't work too close to the edge of the stockpile as it could give way.<br>  | Keep filling out the stockpile one row at a time or by dozing material to the correct position on the stockpile.<br>  |

## 1.2.3.2 Taking from A Stockpile

<table>
<tr>
<td>When you take from a stockpile, try and work neatly.<br>  </td>
<td>Take from the top, working down in layers.<br>  </td>
<td>Do not undercut the stockpile. It might collapse on you.<br>  </td>
</tr>
<tr>
<td>You may need to maintain the stockpile by neatening it up.<br>  </td>
<td colspan="2">To do this, you push material up that has been spread out. Keep the loading area clean and level.<br>  </td>
</tr>
</table>

# 2.1 Plan and Prepare for Dozer Operations

## 2.1.1 Who Has Duty of Care?

You have a duty of care. So does anyone who has something to do with the worksite. Duty of care applies to:

| | |
|---|---|
| Employers/persons conducting a business or undertaking (PCBU). This includes managers, manufacturers/suppliers, importers, designers, inspectors, etc. | Workers. This includes employees, contractors and sub-contractors, employees of labour hire companies, outworkers, volunteers, etc. |
|   |   |

### 2.1.1.1 Worker's Duty of Care

As a worker you must take care of your own health and safety – and the health and safety of others at the workplace. You must not put your own or other people's health and safety at risk.
Never work where you believe a hazard is a serious risk to your health and safety. You must also:

- do your best to follow reasonable health and safety instructions from your boss (PCBU)
- follow workplace health and safety policies and procedures
- do not work where you believe a hazard would be a serious risk to your health and safety.

### 2.1.1.2 PCBU/Employer's Duty of Care

The PCBU must:

- Provide a safe workplace
- Train workers and make sure they know what to do on the job
- Try to get rid of risks, or find ways to minimise risks
- Tell workers about any hazards or risks. Workers must know what to do in an emergency.
- Have a workplace safety plan. For example, workers should be trained in the use of fire fighting equipment and first aid equipment.

**Penalties**

If you are a PCBU/employer or a worker, the government can fine you or even imprison you for failing your duty of care.

## 2.1.2 Work Health & Safety Legislative Requirements

**'Laws to keep your workplace safe'**
WHS/OHS requirements are outlined in Acts, Regulations, Codes of Practice and Australian Standards.


**WHS/OHS Acts**
*'WHS/OHS Acts'* are laws that explain how to improve health and safety in the workplace.
For example: Model National WHS Act, June 2011.
WHS has the same meaning as OHS in this document.

**Regulations**
*'Regulations'* explain specific parts of the Act.
For example: Part 4.3 – Confined spaces, Part 4.4 – Falls.

**Codes of Practice/Compliance Codes**
*'Codes of Practice'* are practical guidelines on how to comply with (meet the rules of) legislation.
For example: HAZARDOUS MANUAL TASKS Code of Practice, 23rd December 2011.

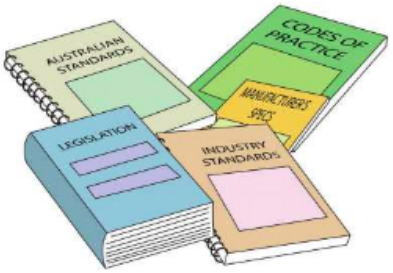
**Australian Standards**
*'Australian Standards'* are work guidelines that set the minimum accepted performance or quality for a specific hazard, process or product.
For example: AS 2550 – Cranes, hoists and winches – safe use set.

# 2.1.3 Where to Find WHS Information

You can check these websites for more information about workplace health and safety. The National WHS Act started in some states/territories on January 1, 2012.


**What are the National Work Health (WHS) and Occupational Health and Safety (OHS) Acts about?**

The Acts explain how to keep your workplace safe and healthy. They explain what you need to do to meet your duty of care.
For example:
You must make sure you do earthmoving work in a way that won't put yourself or others at risk. You must use earthmoving equipment according to instructions.




**Note:**
**Check your state/territory requirements as Acts may vary.**

**Under Health and Safety laws, what are your responsibilities while working?**

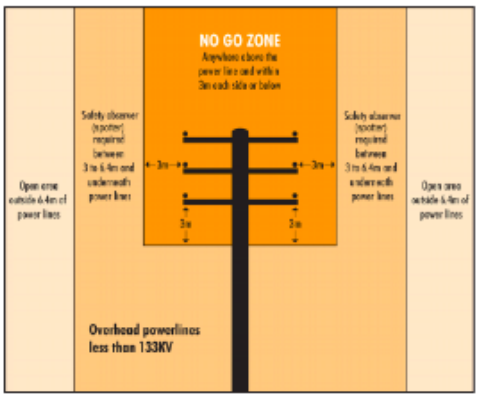
You must work in a way that is safe. You must not risk the health and safety of yourself or others.


**What do codes of practice explain?**

Codes of practice are practical guidelines on how to comply or follow the rules in legislation/laws.
For example:
A traffic management code of practice will tell you all the rules a traffic controller must follow. For example, a traffic controller must have a zero percent blood/ alcohol concentration/ reading while performing traffic control duties.

**What do Australian Standards explain?**

Australian Standards are work guidelines that set the minimum accepted performance or quality for a specific hazard process or product.
For example:
A2250.1-2011 - Powerline distances
This standard tell you the distances you can safely work near powerlines on poles and towers.




**What are examples of documentation you should read before doing earthmoving work?**

- Health and Safety Acts and Regulations
- Codes of practice
- Manufacturer's specifications
- Operator's manual
- Site requirements and procedures
- Work and/or quality requirements
- Drawings and sketches of the work to be done
- Company policies and procedures for employment and workplace relations, Equal opportunity and disability.
- Standards, eg: AS 2598-1995 Earthmoving machinery

**Why should you check the operator's manual before using earthmoving equipment?**

The operator's manual tells you how to operate your machine. The manual also tells you about maintenance (how to keep your machine working well).


**What kinds of information do you need before starting work?**

- Plans – Drawings and sketches outlining what you need to do
- Specifications – rules and details about the job
- Operational details – how you will do the job
- Quality requirements of the job – the standards you are expected to meet.

**What are quality requirements?**

The quality requirements tell you the standards you must meet when doing earthmoving work. They tell you what you need to do and how to do it to satisfy the customer. You may need to follow codes of practice, regulations, national standards etc.

**Slab Foundation Preparation.**
**Quality & Specification check list.**

| √ | Job stage | Checked by |
|---|---|---|
| | Correct area pegged out | |
| | Vegetation removed | |
| | Top soil removed and stockpiled | |
| | Slab size pegged out in correct location | |
| | Slab size pegged out to correct size | |
| | Level markers in place | |
| | Site leveled to pegs | |
| | Crushed rock is correct size as per specification | |
| | Slab area boxed to correct height off floor | |
| | Crush rock is the correct height as specified | |
| | Boxing pegs at correct spacing and depth | |
| | Crushed rock is level to specification | |
| | Crushed rock covers the specified area | |
| | Crushed rock compaction meets specifications | |
| | Compacted crushed rock base is at the specified height | |
| | Slab preparation meets specification and ready for concrete contractor | |
| | Contractor notified ____/____/____ @ _____AM / PM | |

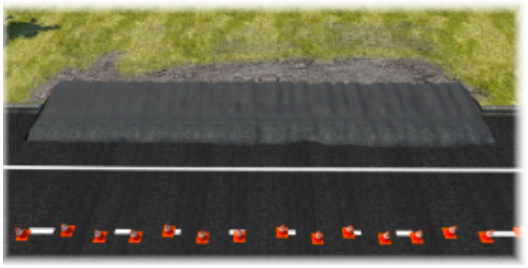



**What do the job's work instructions explain?**

Work instructions explain:

# 2.1.4 Calculation

## 2.1.4.1 Working Out How Much Material You Need



The work plan has an area which is 4 metres × 20 metres that must be covered by a layer of road base of 150 mm depth.

**How many square metres of road base are to be laid?**
**How many cubic metres of road base will you need?**

**Step 1:**

To work out the square metres, multiply the Length (L) by the Width (W).

L × W = Square metres

4 m × 20 m = 80 square metres

This can also be written as:

80 $m^2$ or 80 square metres

**Step 2:**

Convert the layer thickness from millimeters to metres.

To do this divide the layer thickness by 1000

150 mm ÷ 1000 = 0.15 m

**Step 3:**

Multiply the square metres by the layer thickness to get the cubic metres.

80 square metres × 0.15 m

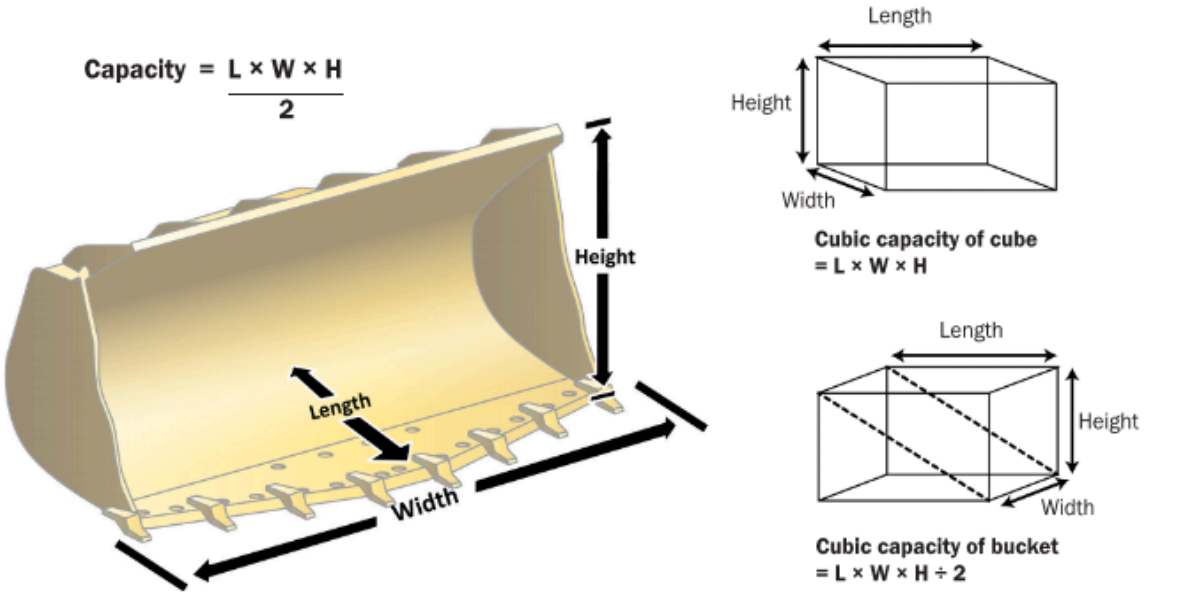
= 12 cubic metres

This can also be written as:

12 $m^3$ or 12 cubic metres

Answer:
There are 80 square metres of road base to be laid.
You will need 12 cubic metres to cover the area to 150 mm depth.

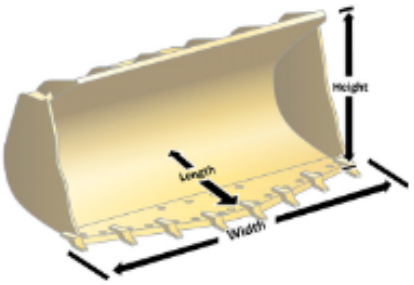
## 2.1.4.2 How to Find the Cubic Capacity of A Bucket




Cubic capacity is ÷ 2 because of the shape of the bucket (a triangular prism)

### 2.1.4.3 Loading A Truck to Capacity

This truck has an 8 tonne load capacity. Dry beach sand weighs 2 tonnes per cubic metre.



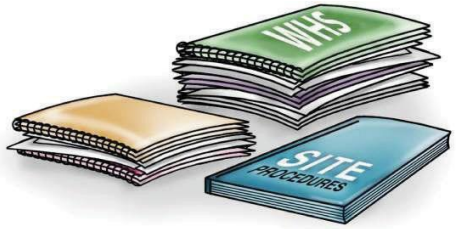

**How many buckets will it take to fill the truck to capacity using a bucket with these dimensions?**
Bucket dimensions:
- Length = 2 metres
- Width = 1 metre
- Height = 1 metre

| Step 1: | Step 2: | Step 3: | Step 4: |
|---|---|---|---|
| To calculate the capacity of the bucket, use the formula:<br>L × W × H ÷ 2<br>2 × 1 × 1 ÷ 2<br>= 1 cubic metre<br>Capacity of the bucket<br>= 1 cubic metre | The weight of dry sand is known (see Table of Common Weights).<br>Dry sand weighs 2 tonnes per cubic metre<br>Weight of material<br>= 2 tonnes (per cubic metre) | The bucket has a capacity of 1 cubic metre. So a full bucket of dry sand will weigh 2 tonnes.<br>Bucket capacity<br>× Weight of material<br>(per cubic metre)<br>1 × 2 = 2 tonnes<br>Each full bucket of dry beach sand weighs 2 tonnes. | Truck load capacity is 8 tonnes.<br>8 tonnes (truck)<br>÷ 2 tonnes (per bucket)<br>= 4 buckets |

Answer:
It will take 4 buckets of sand to fill the truck to capacity.

## 2.1.5 Worksite requirements

Examples of documents and training your employer should provide include:



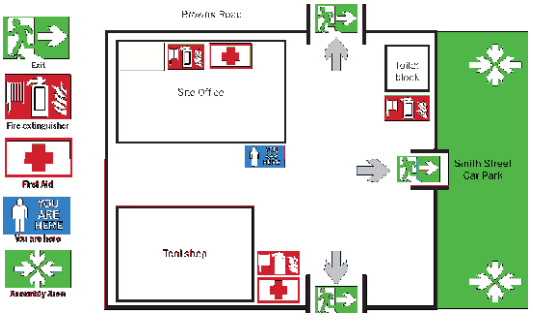

- Safety plan for the site
- Emergency procedures, for example a site evacuation plan
- Environmental management plan for the job.

## 2.1.6 Emergency Evacuation Plan

Many worksites have an emergency evacuation plan which is displayed on the noticeboard.

You should make sure you know how to interpret this plan.

For example, start by looking for a 'You are here' sticker on the plan drawing. Note how nearby areas are shown on the plan. Then work out where the emergency exit is – on the plan and in real life.



# 2.1.7 Earthmoving Site Hazards

## 2.1.7.1 Checking for Underground Services

You should always check where services are before you start work. You may phone 'Dial before you dig on 1100'. You may look at the site plan or talk to your supervisor. You may need to look at the location of pits and meters to get an idea of where the services run. You may need to check with the local council or service company. You may even need to get underground detection equipment.

If you hit a service line, contact the provider immediately. You may need to organise to get the service disconnected while a qualified person fixes the problem.

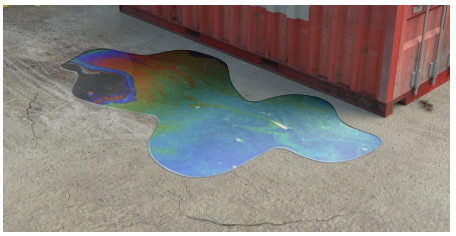
You can sometimes tell there are services below by the types of ground. Some services are surrounded by a different type of soil, rock or sand. You may notice that the soil is looser, or does not match the soil around where you are digging. There may be a line of tape alerting you to the services.

If you suspect there are services underground, stop working. Check the ground. You may need to excavate the area by hand, or dig in another area.

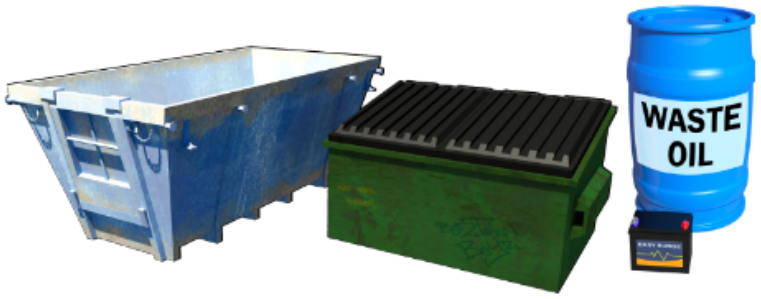
# 2.1.8 Environmental Management Plan (EMP)

The Environmental management plan (EMP) tells you important things about the environment at the worksite. It explains how the work you are doing could damage the environment. The possibility that you will cause this damage is called the environmental risk.


The EMP tells you what you must do so you do not damage the environment. It tells you how to work in a way that reduces damage to the environment.



The EMP also tells you how the worksite meets all environmental protection laws and what to do with waste.




## 2.1.8.1 Example of an Environmental Management Plan

| | | | |
|---|---|---|---|
| **Company Details:** | EGA Earthworks – 19 Chandler Road, Boronia. Vic. 3155. | | |
| **Work description:** | Soil removal | | |
| **Date** | 12/12/2015 | **Contact** | Dick Osborne – 0455 555 555 |

| Environmental concerns for the site | Risk Level | Risk likelihood | Protection measures |
|---|---|---|---|
| Excessive noise generation associated with the construction and operation of support infrastructure. Public nuisance /complaints. | Minor | Possible | Work on site to be carried out between 7:00am and 6:00pm. |
| Vegetation loss leading to increased runoff during wet periods. | Moderate | Almost certain | Use cut off drains to direct water away from area being worked on. Put silt cloth barrier on high side of trench. Put straw bales in trench to filter water. |
| Mud on surrounding roads near entry and exit points. | Moderate | Possible | Use rumble grids and wash wheels of vehicles leaving site. |
| Dust generation due to removal of top soil. | Moderate | Likely | Use water carts to keep soil moist. |
| Combustion products from exhaust pipes. Air emissions. | Moderate | Likely | Check that catalytic converters fitted to machinery. |
| Damage to remaining trees on site. | Moderate | Possible | Use temporary fencing and/or safety mesh to isolate trees from surrounding work. |

| | | | |
|---|---|---|---|
| **Approved by:** | TJ Crossbow | **Signed:** | TJ Crossbow |

## 2.1.8.2 Working with an Environmental Management Plan

When preparing an Environmental management plan (EMP) there are three things you must decide:

1. How serious is the environmental risk?
2. How likely is it to happen?
3. How can you control the risk?

**How can you control the environmental risk?**

Here are some examples of environmental risks and the controls that could be used. They can be written into an environmental management plan.

Example 1

Risk : Soil and clay spread on residential streets.

Cause : Not cleaning wheels of vehicles leaving the worksite.

Control : Wash wheels or use rumble grids or put gravel at exit points.

Example 2

Risk : Noise.

Cause : Engine noise from heavy machinery.

Control : Work on site to be carried out between 7 am and 6 pm.

Example 3

Risk : Loss of topsoil.

Cause : Driving across a paddock or over vegetation.

Control : Go around the paddock even if it increases the time the job takes.

## How serious is the environmental risk?

You can use the following table to rate how serious the environmental risks are.

| Level | Rating | Examples of impact on the environment |
|---|---|---|
| **1** | **Catastrophic** | **Death, injury or illness to humans or animals. Destruction of a heritage site. Toxic release into waterway and groundwater.** |
| **2** | **Major** | **Release leading to measurable change to storm water quality. Soil contamination over a wide area. Damage to a heritage site.** |
| **3** | **Moderate** | **Short term minor change to ecosystems. On site release that is contained with little contamination. Localised, short-term change in storm water quality.** |
| **4** | **Minor** | **On-site release immediately contained. Isolated complaints from the community.** |
| **5** | **Insignificant** | **Impact on the environment is too small to measure.** |

### How likely is the environmental risk?

You can use the following table to rate how likely it is that an environmental incident may happen.

| Level | Rating | Examples of impact on the environment |
|---|---|---|
| **A** | **Almost certain** | **Environmental concerns that you expect will happen.** |
| **B** | **Likely** | **Environmental problem that has happened in the past and is likely to happen again.** |
| **C** | **Possible** | **Environmental concern that has sometimes been a concern and may happen.** |
| **D** | **Unlikely** | **Environmental concern that has sometimes been a concern but is not expected to happen.** |
| **E** | **Rare** | **Environmental issues that are very unlikely to happen.** |

## 2.1.9 Earthmoving Hazards and Risks

The most common hazards and risks with earthmoving work are:

| | | |
|---|---|---|
| Falls from plant or machinery  | Traffic and other mobile plant  | Overhead or underground power  |
| Underground gas lines  | Water and sewage piping  | Rollovers  |
| Noise  | Dust  | Manual handling  |

| Contaminated soil | Falling into trenches or excavations | UV rays (radiation) from working in the sun |
|---|---|---|
|  |  |  |

## 2.1.10 Decibel Levels of Common Sounds

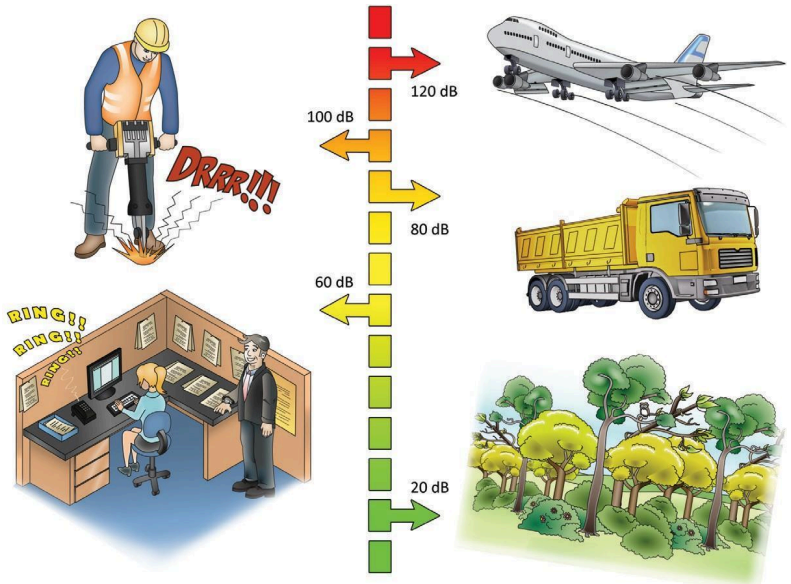
You must wear hearing protection when operating heavy equipment. This is important because 8 hours of noise at 85 db (decibels), or noise levels of 140 db even briefly can permanently damage your hearing.

Hearing loss is:

- Slow
- Painless
- irreversible.

Here are some examples of levels of noise in different environments.

- A forest has about 20 db of noise
- In an office there might be around 60 db
- Standing outside a truck generates about 80 db
- A jackhammer generates around 100 db
- A jet taking off generates about 120 db



## 2.1.11 Chemicals and Solvents


Chemicals should always have a label, so that you can easily tell what you are working with. They should be stored in a safe place where nobody may accidentally come in contact with them.

Always check the safety data sheet (SDS) before handling any chemicals.

An employer must provide an SDS to a person using chemicals in the workplace. They must make sure the person using the chemical knows how to read and understand the SDS.

If you are not sure about a chemical, put the chemicals in a safe, isolated area and talk to your supervisor.

## 2.1.12 Fatigue

Fatigue is an acute, ongoing state of tiredness that leads to mental or physical exhaustion and prevents people from functioning normally. It is more than feeling tired and drowsy, it is a physical condition that can occur when a person's physical or mental limits are reached.

Fatigue can happen because of work or lifestyle related factors. Fatigue is a significant hazard and can lead to poor concentration, slow reaction times and increased mistakes.

| Work related factors | Lifestyle related factors |
|---|---|
| • Working time<br>• Scheduling and planning (for example: rosters, length and timing of shifts)<br>• Inadequate rest breaks<br>• Lengthy periods of time being awake<br>• Insufficient recovery time between shifts<br>• Payment incentives that may lead to working longer shifts<br>• Environmental conditions (for example: climate, light, noise)<br>• Type of work being undertaken (for example: physically or mentally demanding)<br>• Work demands placed on the person (for example: time frames, deadlines)<br>• The organisation's culture<br>• The person's role within the organisation. | • Inadequate or poor quality of sleep due to sleep disorders<br>• Social life<br>• Family responsibilities<br>• Other employment<br>• Travel time<br>• Health and wellbeing (for example: nutrition and diet, exercise, pain, illness). |

### 2.1.12.1 Signs of Fatigue

You should be able to identify signs of fatigue in yourself and others. A person who is affected by fatigue may display the following signs:

- Headaches and/or dizziness
- Wandering or disconnected thoughts, daydreaming, lack of concentration
- Blurred vision or difficulty keeping eyes open

- Constant yawning, a drowsy relaxed feeling or falling asleep at work
- Moodiness, such as irritability
- Short term memory problems
- Low motivation
- Hallucinations
- Impaired decision-making and judgment
- Slowed reflexes and responses
- Reduced immune system function
- Increased errors
- Extended sleep during days off work
- Falling asleep for less than a second to a few seconds, and being unaware they have done so (otherwise known as micro-sleeps)
- Drifting in and out of traffic lanes or missing gear changes and turn offs when driving.


### 2.1.12.2 Managing Fatigue

Sleep is the only effective long term strategy to prevent and manage fatigue. While tired muscles can recover with rest, the brain can only recover with sleep. The most beneficial sleep is a good night's sleep taken in a single continuous period.

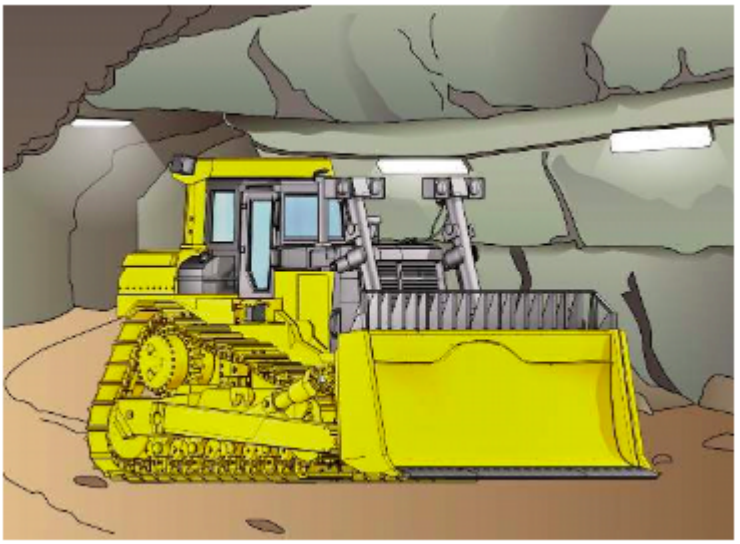
## 2.1.13 Confined Space

A confined space is an enclosed or partially enclosed area. It is an area that was not designed for people to go into. It may have no natural or mechanical ventilation. There are also hazards (such as a gas or flammable substance) that makes it dangerous.

Gases in the atmosphere such as LPG, which are heavier than air, may enter spaces like trenches, underground tanks or pits displacing oxygen.

When you drive a petrol, gas, or diesel machine into a space like this you create a hazard. The exhaust gasses can fill the space. Dangerous gases like carbon monoxide can build up in the area. You can't smell all the dangerous gasses or fumes. You might breathe in a dangerous gas and not even know it. The gas could make you unconscious or even kill you.

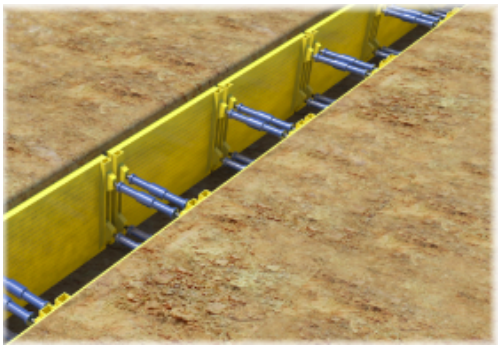
You must be trained to work in a confined space, you must also have a permit. The permit makes sure you have thought about all hazards and controls, including a rescue plan, and that you have a team there to help you in case something goes wrong. You must get your permit approved by a supervisor.
If you are going to work a machine in a confined space, you might need a catalytic converter installed. A catalytic converter takes out harmful gasses (like hydrocarbons, carbon monoxide and nitrogen oxides) and turns them into harmless gasses (like carbon dioxide, water and oxygen).



# 2.1.14 Safety around Trenches

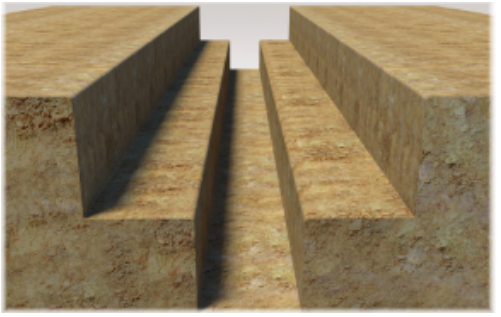
There is a risk that a person could fall into an open trench or excavation on a worksite. People working in trenches are at risk of being crushed or trapped if the trench caves in. You must try to reduce this risk. Isolation is a good way to reduce the risk. You could put up para-webbing, barriers or temporary fencing. You may put trench shields with guard rails.

## 2.1.14.1 Trench Shields and Shoring



If a trench is 1.5 metres deep or more you must use trench shields or shoring. You should use trench shields that have approved lifting points. The shields weight must be permanently marked on the shield. If the shield does not have its weight marked, it must be rigged by a licenced dogger or rigger. The shoring must meet Australian Standard 4744: Steel shoring and trench lining equipment. It must also come with an instruction manual. You should secure a ladder for workers to get in and out of the trench.

## 2.1.14.2 Benching



Benching is where you cut levels in the soil to reduce the fall risk. For example, instead of having a single 2 metre trench, this area is excavated in two (2) levels. The first level is a 1 metre drop and is 3 metres wide. The second level is 1 metre × 1 metre.

## 2.1.14.3 Battering

Battering is where the edges of a trench are 'tapered' back on a gentle slope. Battering means that instead of a straight drop off, you have a more gentle slope. In this example, the drop off has been 'battered' back so the fall hazard is reduced. Benching and battering reduce both the fall risk and the risk of collapse.

# 2.1.15 Job Safety and Environment Analysis (JSEA) or Safe Work Method Statement (SWMS)

These forms help you plan for the work you will do. It is very important you fill these out before you start work. They help you work out the tools, equipment and PPE you need to do the job safely. All workplaces should have these types of forms.

Example:

## Job safety and environment analysis (JSEA)/Safe work method statement (SWMS) 123456

| 1. ACTIVITY/TASK INFORMATION AND LOCATION | |
|---|---|
| **Location/Project:** | 123 Belmaine Highway, Roseville |
| **Activity or Task Description:** | Load spoil from excavation right hand turn lane |
| **Competency/Qualification needed to do work safely:** | All operators have current tickets |

**2. HAZARD IDENTIFICATION**

| Location/Area Hazards | | Rate | Work/Task Hazards | | Rate | Work/Task Hazards | | Rate |
|---|---|---|---|---|---|---|---|---|
| **Area** | | | **Visibility and hearing** | | | **Plant/machinery** | | |
| Entry or exit is difficult | | | Poor lighting | | | Plant or Machinery | X | 8 |
| Engulfment/entrapment | | | Poor visibility | | | Tools/equipment | | |
| Work at heights | | | Bright lights/UV | | | Traffic | X | 8 |
| Confined space | | | High noise levels | X | 7 | Pedestrians | | |
| Remote location | | | Communication difficulties | | | Railway | | |
| Rescue could be difficult | | | **Services** | | | Pneumatics | | |
| Temperature extremes | | | Multiple electrical feeds | | | Process lines | | |
| Hazardous/Toxic substances (attach MSDS) | | | Electrical hazards - LV | | | Suspended loads | | |
| | | | Electrical hazards - HV | | | **Slips/trips/falls** | | |
| **Gasses/oxygen/chemicals** | | | Overhead power | X | 8 | Slips/trip hazard | | |
| Poisonous gas/es | | | UG services (gas, power, water) | | | Fall hazard | | |
| Explosive/flamable gas | | | **Hazardous/toxic substances** | | | **Other** | | |
| Oxygen levels (high or low) | | | Pressurised fluids | | | Sharp materials | | |
| Inhalable dusts/fibres | | | Gas cylinders | | | Confined space | | |
| Hazardous/toxic substances (attach MSDS) | | | Flammable materials | | | Work at heights | | |
| | | | Toxic materials | | | Welding/Grinding | | |
| **Exposure** | | | Acids/solvents | | | Manual handling | | |
| Heat/Cold | | | Other chemicals | | | Using ladders | | |
| Sunlight/ Radiation | X | 4 | Inhalable dusts/fibres | | | Using EWPs | | |

| 3. PPE | | 4. ACCESS/EQUIPMENT/ISOLATION | |
|---|---|---|---|
| **Hands, feet and body** | | **Access equipment** | |
| Gloves: (type)..... | X | Scaffold | |
| Safety boots | X | Ladders | |
| Long sleeves/pants | X | EWP | |
| High visibility vest/clothing | X | | |
| **Head and face** | | | |
| Safety glasses/sun glasses | X | **Static plant/equipment:** | |
| Full face shield | | | |
| Hearing protection | X | | |
| Hard hat | X | **Mobile plant/equipment:** | |
| Dust gas mask | | Excavators, Loaders, Trucks, Machine | X |
| Breathing apparatus | | | X |
| Welding face shield | | **Safety/emergency equipment:** | |
| **Fall protection and access** | | | |
| Safety harness | | | |
| Fall protection equipment | | | |
| Fall arrest equipment | | **Isolation and warnings** | |
| Other: | | Barricades | X |
| | | Group isolation | |
| | | Personal locks or lock out tags | |
| | | Warning signs | X |
| | | Area lighting | |
| | | Other: | |
| | | Traffic controllers | X |

| 5. ENVIRONMENTAL | | |
|---|---|---|
| **Environmental Hazards** | ✓ X | **Rate** |
| Air pollution (dust, fumes) | X | 5 |
| Noise (plant and equipment) | X | 5 |
| Spills to drains/waterways | | |
| Spills to ground | X | 5 |
| Soil erosion | | |
| Hazard to flora/fauna | | |
| Other: | | |

**Risk Rating Table:** Use the following table to rate the risk.
- 1-2 = Low
- 3-4 = Medium
- 5-6 = High
- 7-8 = Extreme

| Likelihood: (How likely is it to occur) | Consequences: Catastrophic | Major | Moderate | Minor |
|---|---|---|---|---|
| **Almost Certain** | 8 | 7 | 6 | 5 |
| **Likely** | 7 | 6 | 5 | 4 |
| **Possible** | 6 | 5 | 4 | 3 |
| **Unlikely** | 5 | 4 | 3 | 2 |
| **Rare** | 4 | 3 | 2 | 1 |

**6. PERMITS (Attach and record number)**

| | | | | | |
|---|---|---|---|---|---|
| Hot work | | Excavation | N/A | Hazardous work | |
| ~~Access to work area~~ | | High voltage | | Confined space | |
| | | | | | |

## Job safety and environment analysis (JSEA)/Safe work method statement (SWMS) 123456

**7. JOB STEPS, HAZARDS AND CONTROLS**

| Step (No.) | Job Step (Describe each step) | Hazard/Environmental Issue | Risk Rating (Before control) | Control | Risk Rating (after control) |
|---|---|---|---|---|---|
| 1 | Set up traffic control | Traffic in busy intersection | 8 | Barriers and flag person supplied by ABC Traffic. | 1 |
| | | Noise of traffic and plant | 7 | Hearing protection must be worn at all times. | 1 |
| | | Sunlight | 4 | Long sleeve pants, tops, hard hats with visor and sunglasses. | 1 |
| 2 | Unload excavator from float | Excavator sliding on ramps | 5 | Pedestrian exclusion zones 1.5 x excav. height. Operator wear seat belt. | 3 |
| 3 | Excavate turn lane | Powerlines overhead | 8 | Power will be isolated. This must be confirmed before starting. | 1 |
| 4 | Load tip truck | Location of tip truck and drivers while loading. | 8 | Traffic controllers will direct drivers where to safely park. Drivers must remain in truck while being loaded. | 1 |
| 5 | Load excavator on float | | | | |
| | | Dust and noise | 5 | Noise restrictions limit work to between 9am–5pm. Water truck available to reduce dust if needed. | 2 |
| | | Spills to ground | 5 | Pre-op checks on excavator before work. Spills kit on site if needed. | 2 |

**8. CONSULTATION AND WORKER OFF**

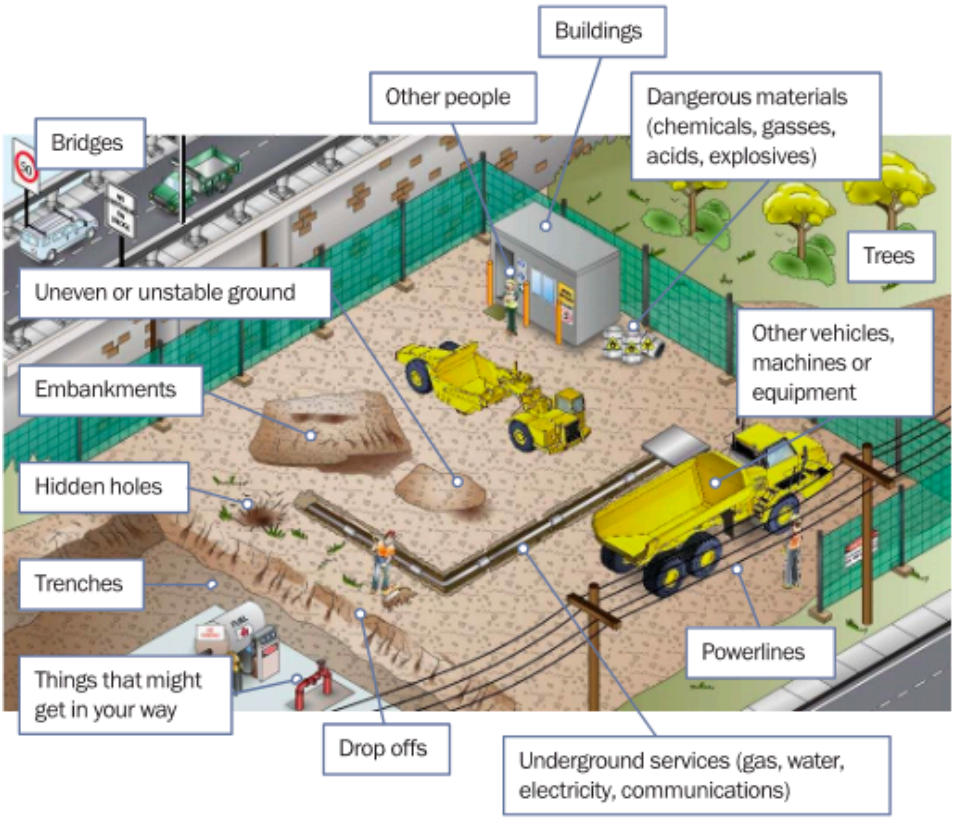
*By putting my signature below I confirm that I have attended a briefing and understand and will comply with all environmental and safety issues, as described in this JSEA/SWMS. I have reviewed and will comply with all necessary paperwork including permits, SDS, isolation plants etc.*

| Name | Signature | Date | Name | Signature | Date |
|---|---|---|---|---|---|
| Dick Osborne | Dick Osborne | 2/4 | | | |
| Paul Williams | Paul Williams | 2/4 | | | |
| Jason Tennant | Jason Tennant | 2/4 | | | |
| Amanda Jones | Amanda Jones | 2/4 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**9. FINAL APPROVAL/SIGN OFF**

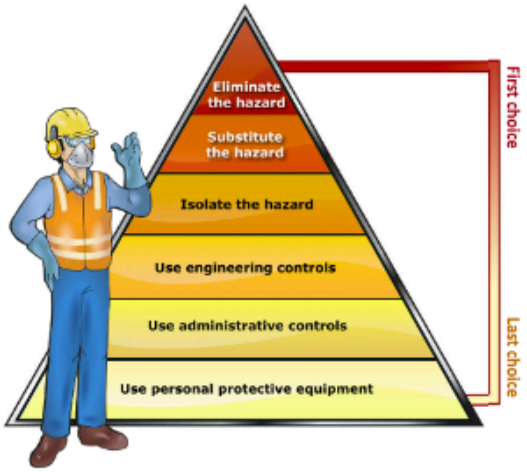
| | Name | Signature | Date |
|---|---|---|---|
| **Approved by:** | Mark Alabaster | Mark Alabaster | 2/4/ |
| **Approved by:** | Duncan Morton | Duncan Morton | 2/4/ |
| **Customer/Client** | N/A | | |

**What are some hazards you must look for before starting work?**




**The hierarchy of hazard control is a list of controls you can use to lower the danger from a hazard on the worksite. What are the six (6) levels in the hierarchy of hazard control from the first choice to the last choice?**

1. **Elimination:** If possible, remove (take away) the hazard.
2. **Substitution:** Use a safer method if you can't remove the hazard.
3. **Isolation:** Stop access to the hazardous (dangerous) area.




4. **Engineering Control Measures:** Change the tools, equipment or environment to make it safer.
5. **Administrative Practices:** Reduce the time the worker is exposed to the hazards by using training, job rotation, the timing of jobs, etc.
6. **Personal Protective Equipment (PPE):** Use PPE as your **last line** of defence.

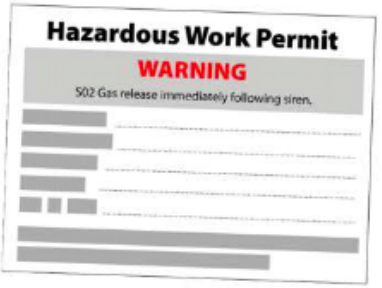
**Memory aid:** **E**very **S**aturday **I** **E**at **A** **P**ie

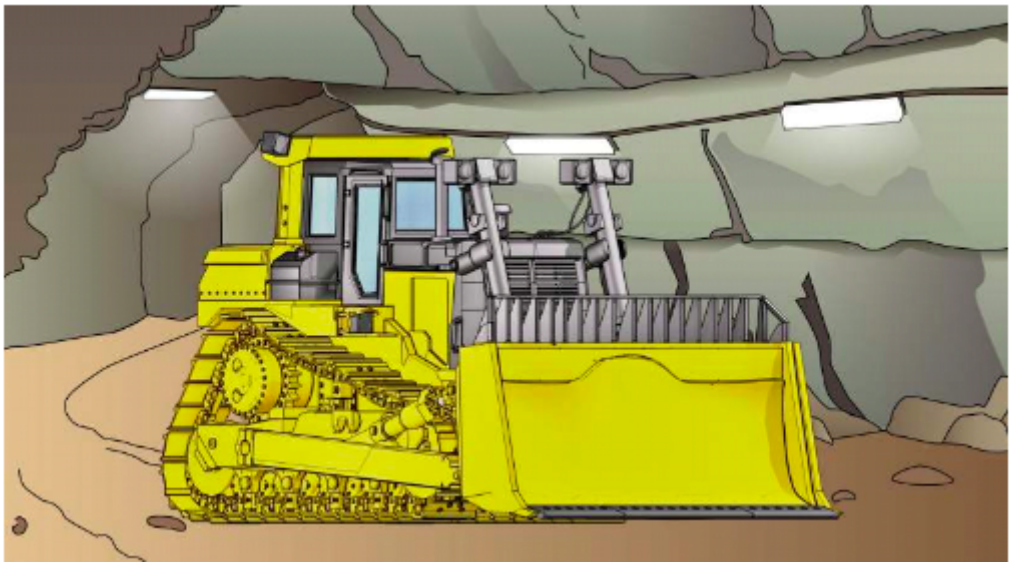
**Who can you ask about underground services on the worksite?**

| | |
|---|---|
| Ask your site supervisor<br>  | Call 'Dial Before You Dig' on 1100 as a guide to services location only. Ask a specialist consultant to check the site.<br>  |
| Ask the local supply authority (for example, the electricity, gas or water company).<br>  | Check the council maps for the site<br>  |

**You will work in a hazardous area, for example, a confined space. What type of permit might you need to get?**

You may need to get a hazardous work permit.

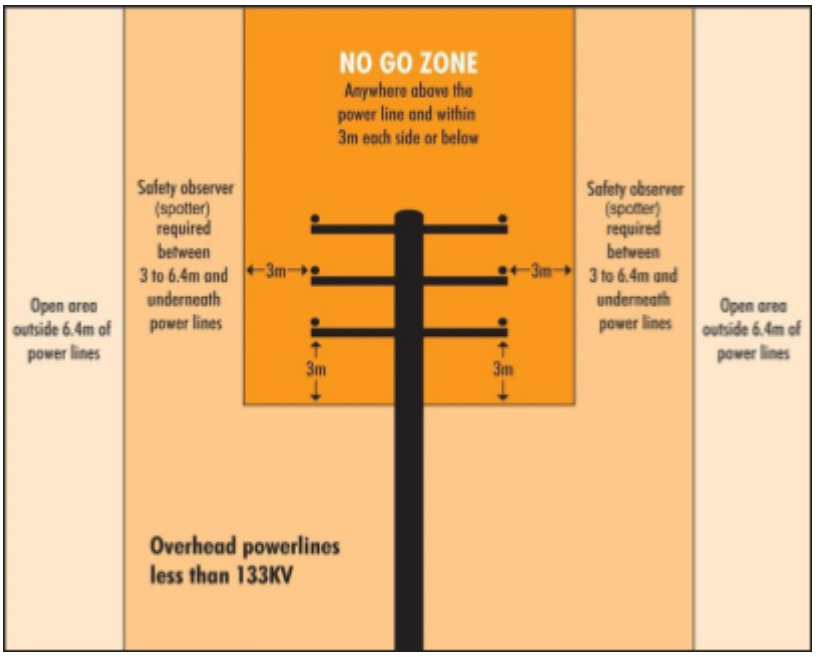


# 2.1.16 Overhead Powerlines on Poles (National Standard)

These are usually 'Low Voltage'. This means powerlines of less than 133KV. The information below is taken from the National Standard.
Always check the distances for your state or territory, as they may be different.

**AS2550.1**
**Powerline distances**




Powerline distances "Look up and live!"

Always check overhead for powerlines and make sure you and any equipment or materials you are using do not come into contact with them.

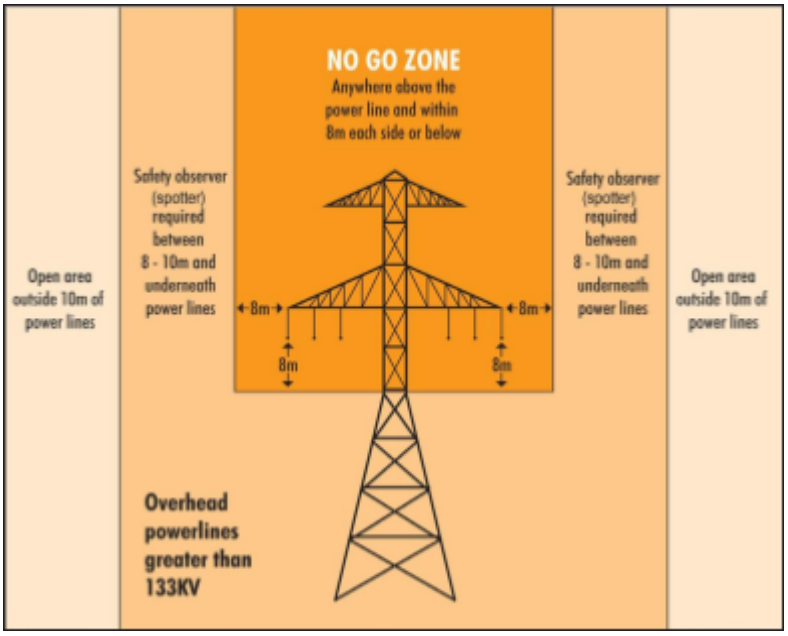
The safe operating distances for working near powerlines are outlined on the following pages. A spotter is required if you are working between 3 to 6.4 metres from distribution lines on poles.

The term 'spotter' is defined as a safety observer who is a person competent for the sole task of observing and warning against unsafe approach to overhead powerlines and other electrical apparatus.

(In Victoria the spotter must be registered by Energy Safe Victoria).

# 2.1.17 Overhead Powerlines on Towers (National Standard)

These are usually 'High Voltage'. This means powerlines of more than 133KV. The information below is taken from the National Standard.
Always check the distances for your state or territory, as they may be different.

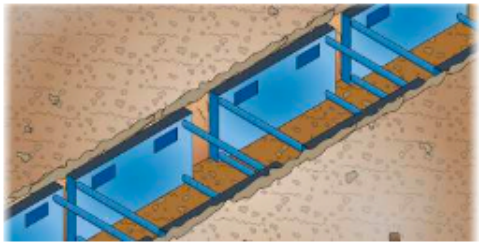
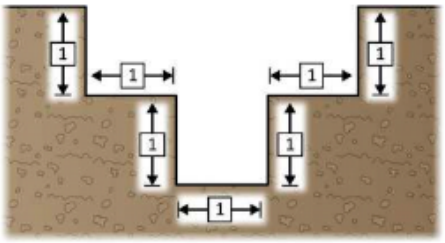
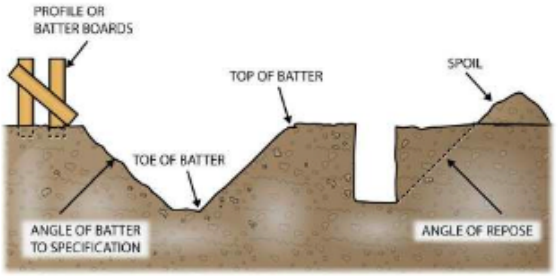



**AS2550.1**
**Powerline distances**

A spotter is required if you are working between 8 to 10 metres from transmission lines on towers.

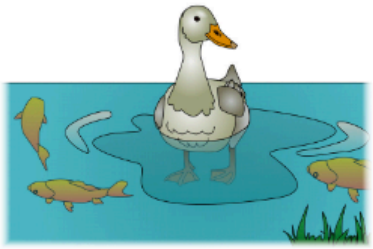
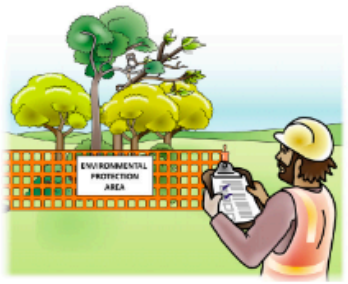
The term 'spotter' is defined as a safety observer who is a person competent for the sole task of observing and warning against unsafe approach to overhead powerlines and other electrical apparatus.

**How can you prevent a trench or excavation from caving in on you?**

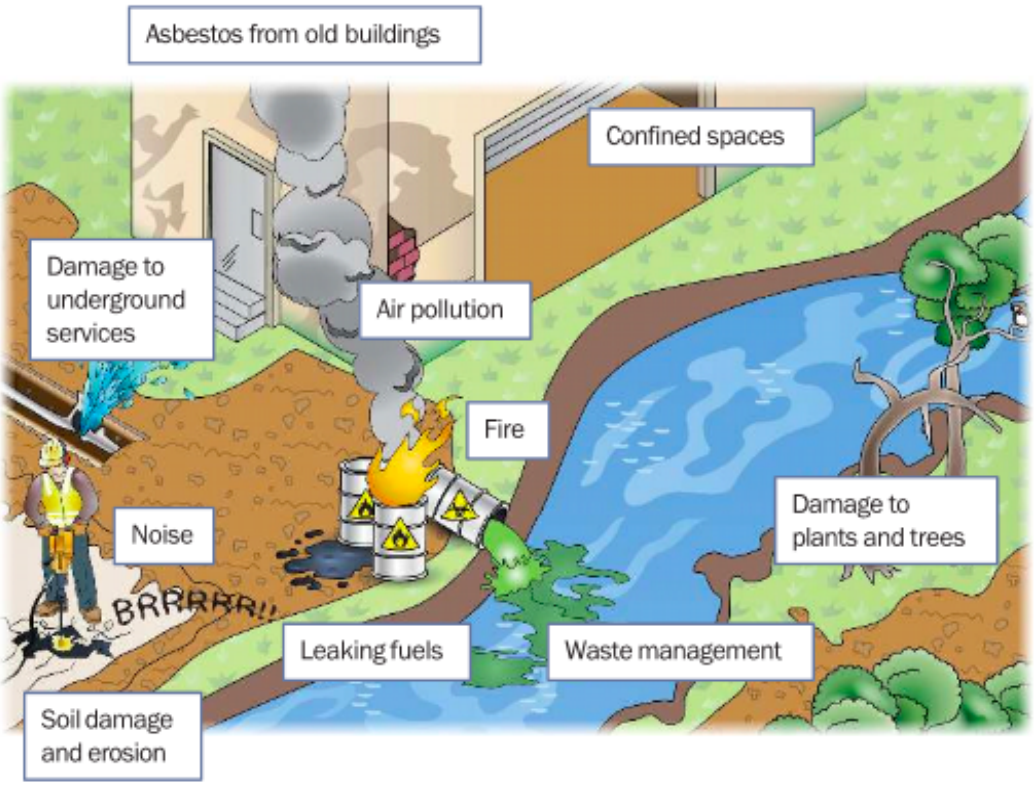
| | |
|---|---|
| Shoring or trench shields. You must use shoring if the excavation is more than 1.5 metres deep. Use shoring in any unstable ground. |  |
| Benching |  |
| Battering |  |

**What does the environmental management plan (EMP) tell you?**

The EMP tells you:

| | |
|---|---|
| Possible risks to the environment on the worksite  | How to work in a way that reduces damage to the environment  |
| How the worksite meets all environmental protection laws  | Who is responsible for each part of the environmental management plan (EMP)  |

**What environmental challenges should you be careful of when working?**




**What kinds of PPE might you use when using a dozer? Explain what you use the PPE for.**

You might use:

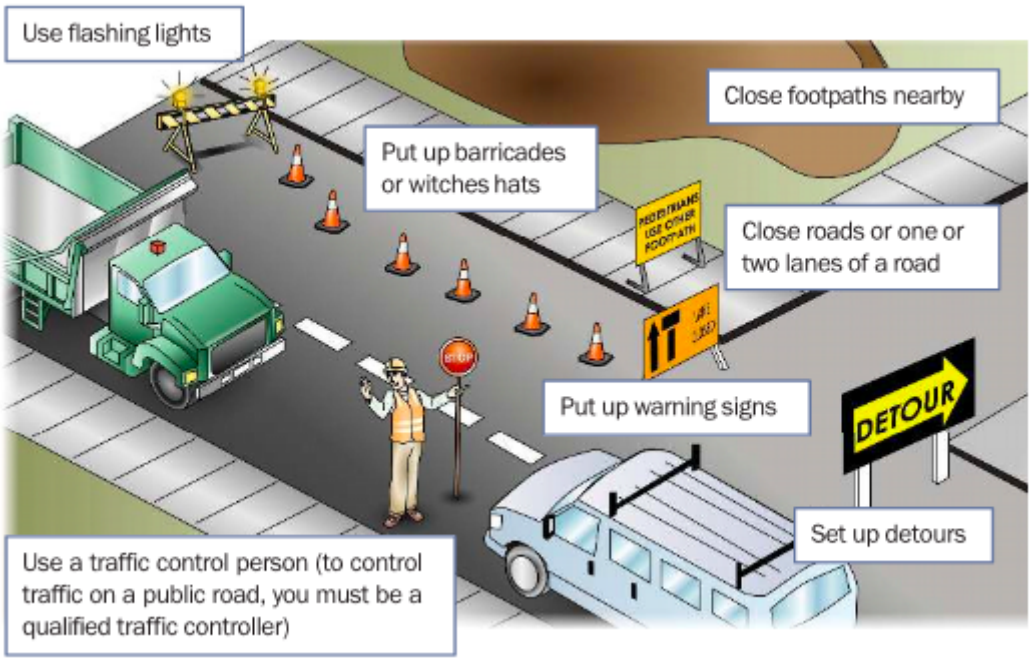
**Non-slip boots** that cover your whole foot. Most sites require steel-capped, lace-up boots to protect your feet.

**Safety vest** – to warn people you are there.

| | |
|---|---|
| **Hard hat/helmet** –<br>to protect your head from falling objects.<br>  | **Gloves** – to protect your hands.<br>  |
| **Ear muffs** – to protect your ears.<br>  | **Safety glasses/goggles** – to protect your eyes.<br>  |

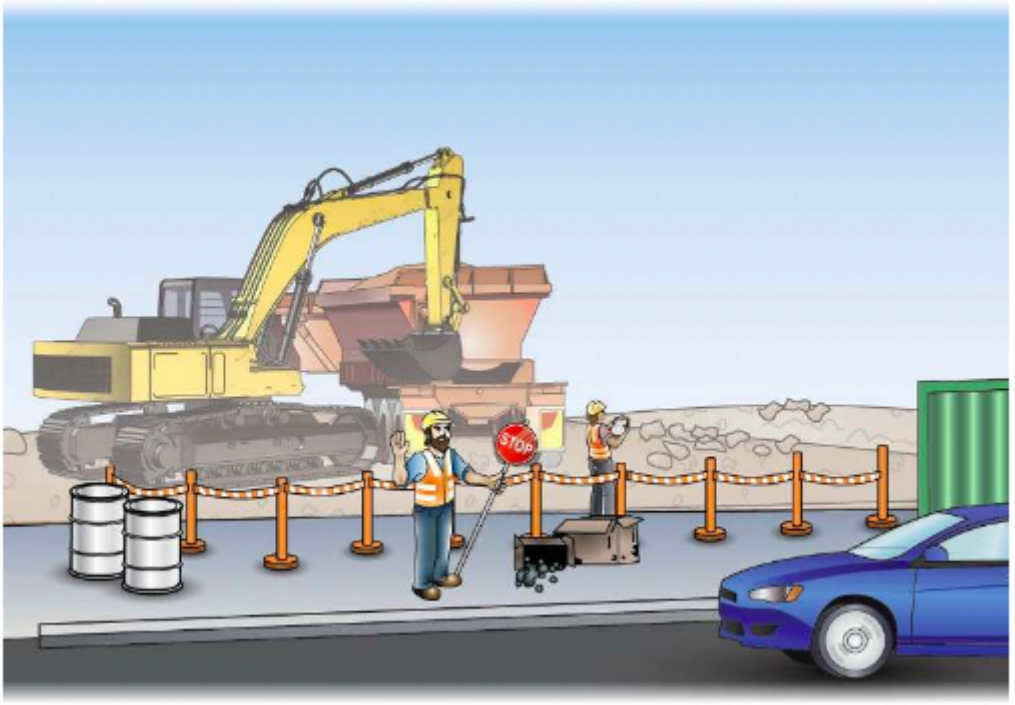
**What can you do to control traffic in and around a worksite?**

You can:



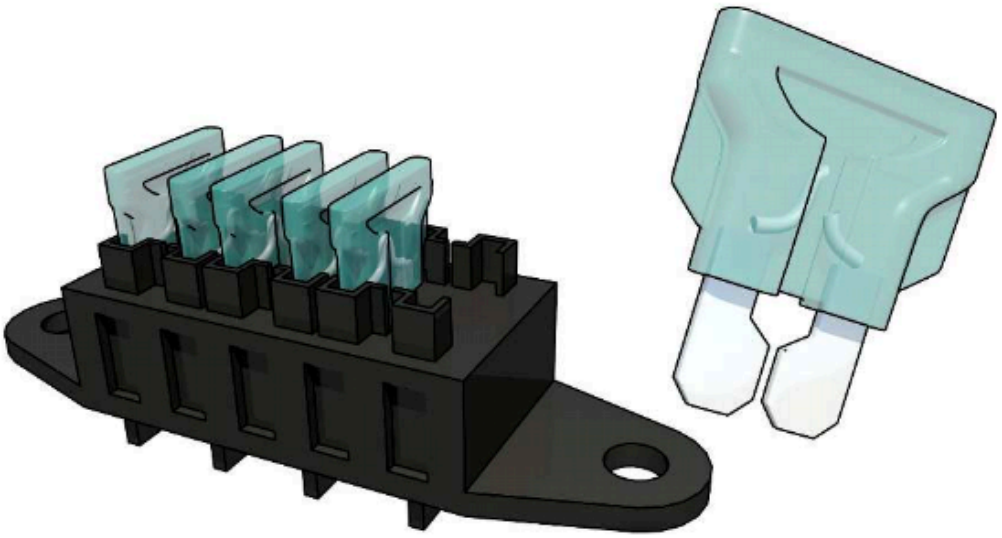
**What does the traffic management plan (TMP) tell you?**

It tells you how to control vehicles in and around the worksite. It helps keep the site safe for you and others. You may require a traffic control licence in your state or territory.




## 2.1.18 Defective Parts

If you notice a defective part, for example, a fuse is blown or not working, you should arrange to have it replaced immediately. You must check the rules for your site and your state or territory. In some states only licenced mechanics are allowed to do any repairs.



# 2.1.19 Tools and Equipment

Here are some typical tools and equipment you might need. Remember, if your workplace has a policy about what PPE you need to use, you must use it.

**Personal protective equipment (PPE)**

- Steel cap boots
- High visibility safety vest
- Hearing protection
- Hard hat
- Goggles/glasses
- Gloves
- Dust mask


**Hand tools**

- Shovel and levels
- Socket sets
- Screwdrivers or wrenches
- Wire brush
- Spanners

**Maintenance equipment**

- Grease gun
- Tyre pressure gauge

**Lifting equipment**

- Slings
- Chains
- Shackles

**What kinds of tools and equipment might you use when doing earthmoving work?**

Shovels

Grease gun

Hand tools such as spanners, ratchets, wrenches, screwdrivers and hammers.

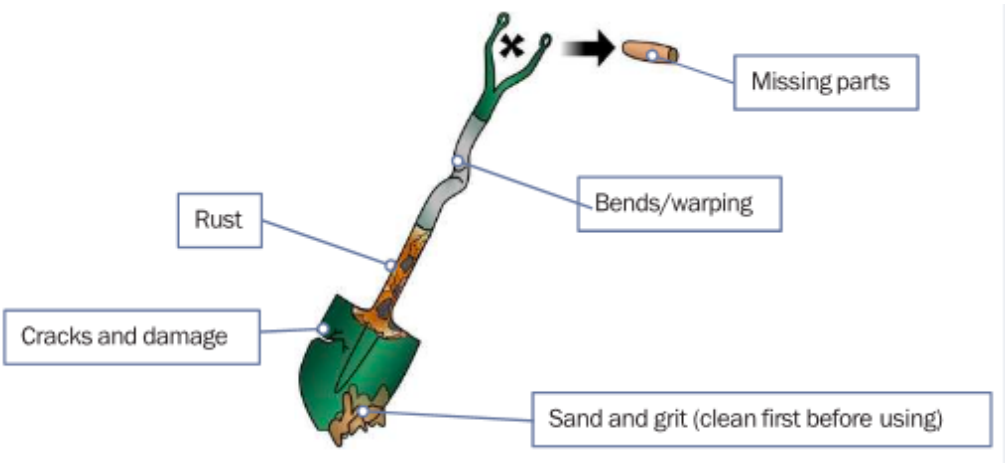
Socket set

Portable lighting

Wire brush

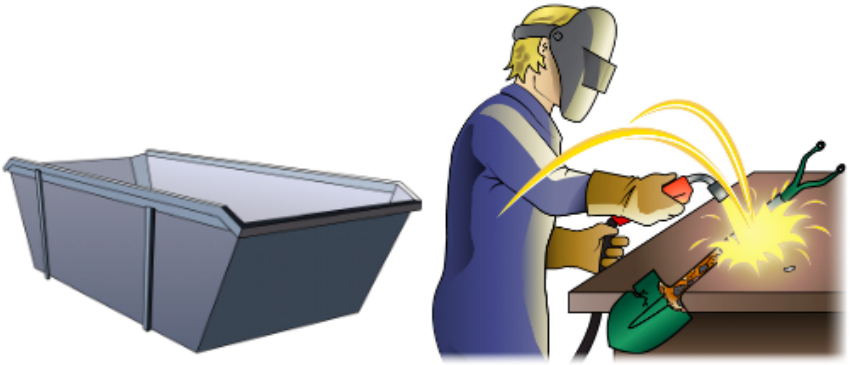
Other hand tools that come with the dozer

**What kinds of faults do you check hand tools for?**




**What do you do with faulty hand tools?**

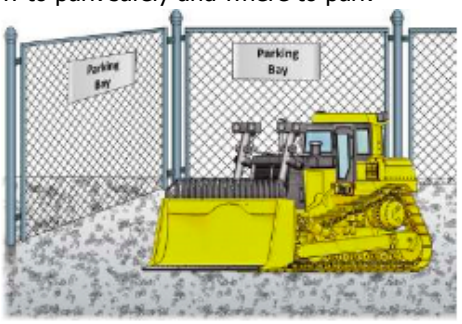
If you can, arrange to have them repaired. If that is not possible, tag them as faulty, or put them in the rubbish.



**What does the safety plan tell you?**

The safety plan tells you how the worksite intends to meet all the safety rules. It tells you:

What personal protective equipment (PPE) to wear

| | |
|---|---|
| How to use tools, plant and equipment safely  | Emergency procedures and exits   |
| How to park safely and where to park   | How to control hazards and risks  |

## 2.1.20 First Aid and Emergencies

Employers should make sure there are trained first aiders and first aid kits available.
The employer should make sure:

- The first aid kits are checked, maintained and kept in a clean dry place.
- There are clear signs indicating the location of first aid kits.
- They have recorded and displayed the numbers and location for emergency services (or local doctors or hospitals).

### 2.1.20.1 Reporting Incidents

As a PCBU, employer or self-employed person you must report serious incidents to the SafeWork authority in your state. You must give a written report within 48 hours if any of the following happen on a site you are controlling:

| A death | An injury that requires medical treatment | Exposure to a substance that requires treatment | Other injuries or health issues caused from a workplace incident. |
|---|---|---|---|
|  |  |  |   |

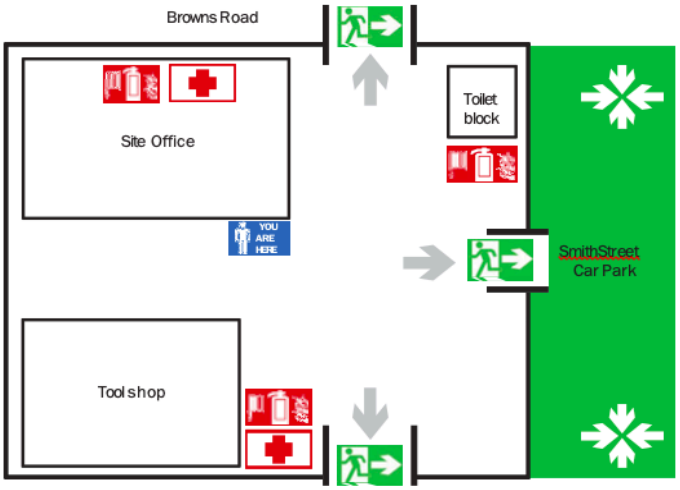
The authorities may send an inspector to come and examine the site. You must leave the site as it is, unless you need to; protect people, help an injured worker, make the site safe, or stop other incidents happening. The inspector will tell you when you can continue working normally.

## 2.1.21 Safety Plan

The safety plan may tell you things like:

- How to use tools and equipment safely
- How hazards and risks need to be controlled
- Emergency procedures
- Emergency exits and assembly areas
- What PPE to wear
- Safe areas to park machinery.


### 2.1.21.1 Site Evacuation Plan (Example)

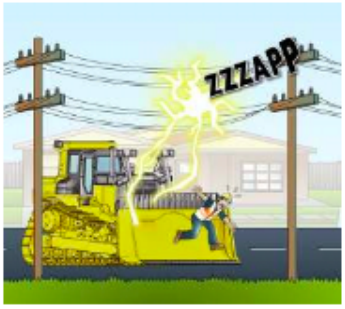



**You are operating a dozer and it touches live powerlines. What do you do?**

Try to stay calm. Stay in your seat if possible. Tell other people to keep away.

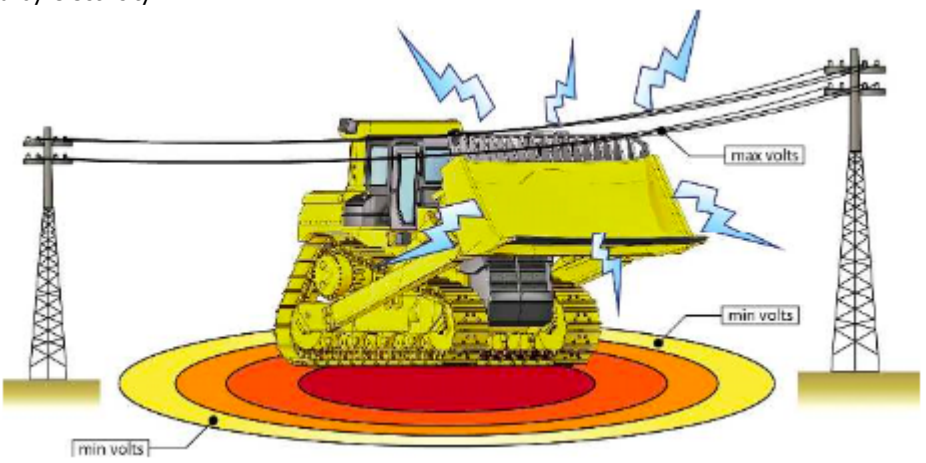

Try to lower the bucket away from the powerlines. Ask someone to get the power turned off.

In an emergency if you are alone or you think the machine might catch fire, jump well clear of the machine.

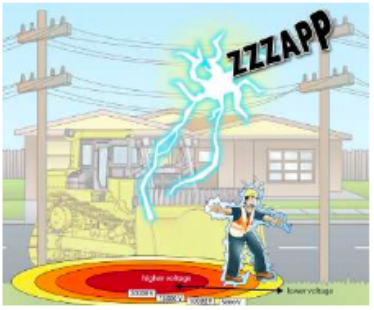



Never touch the ground and the machine at the same time – you may be electrocuted and killed.

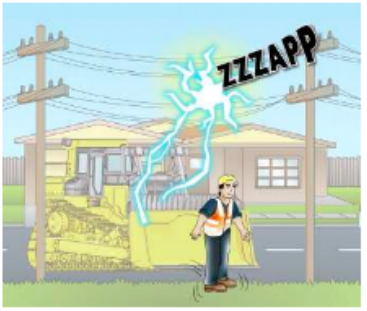

Area affected by electricity




Do not make contact with different ground areas at the same time




Shuffle away keeping your feet closely together



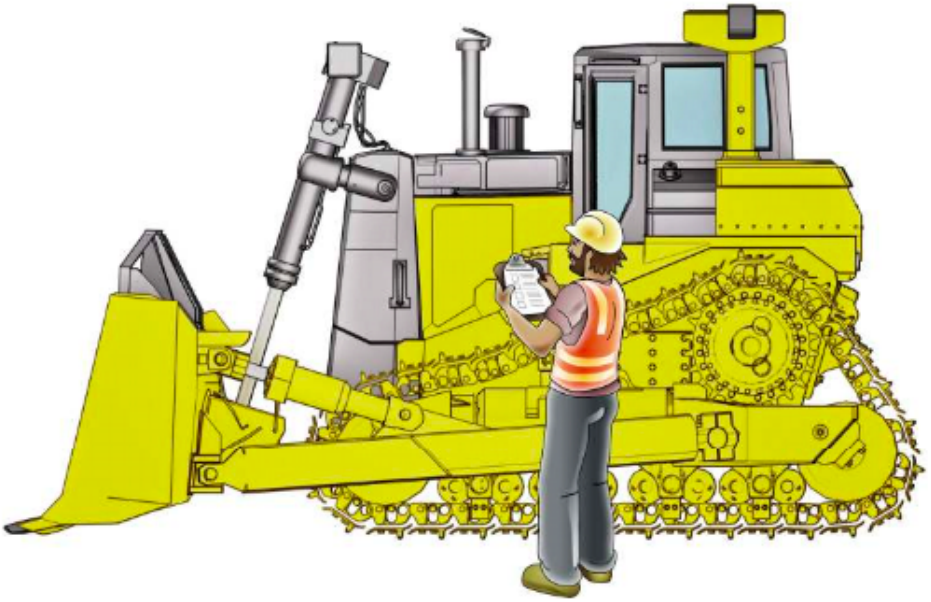
**Who do you talk to if you damage an underground cable, gas line or other service?**

You must tell your supervisor. Your supervisor will tell the relevant authority.


# 2.2 Operate Dozer

**What is the first check you do on the machine?**

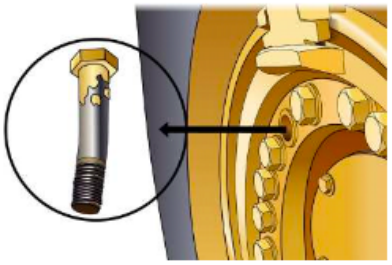
Walk around it and check for defects and damage.



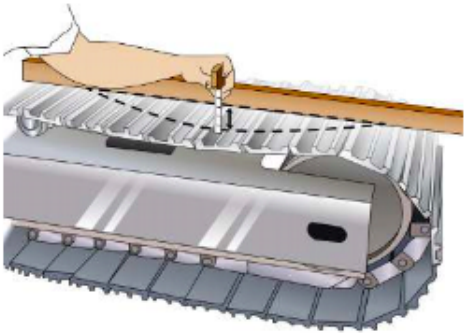
**What pre-start checks do you do before using the dozer?**

Checks may include:

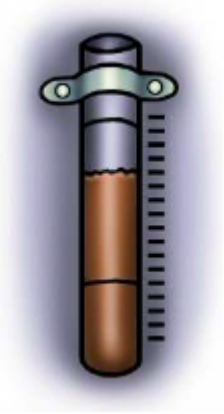
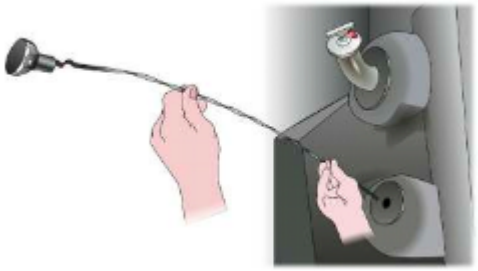
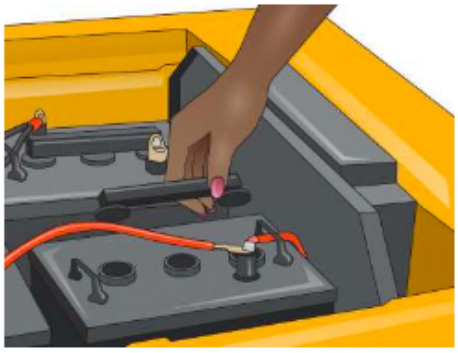
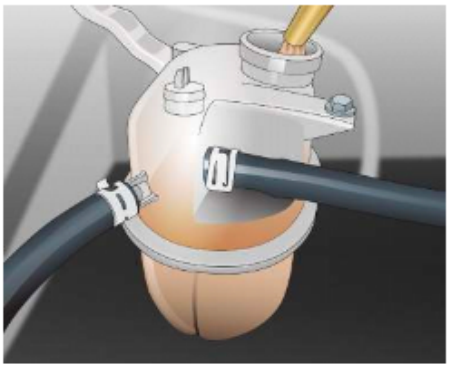
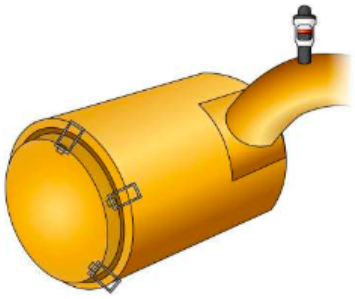
Tyre condition, tyre pressure and wheel nuts (rubber tyred machines only)



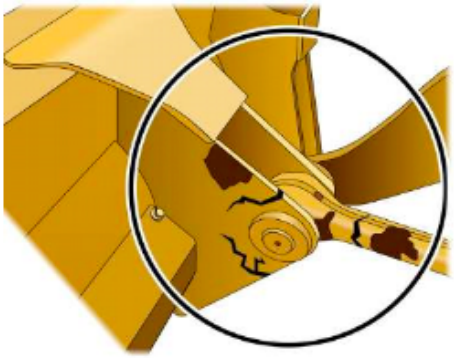
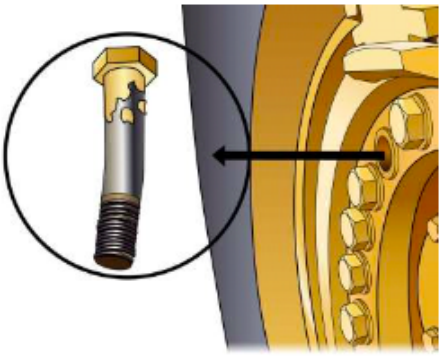
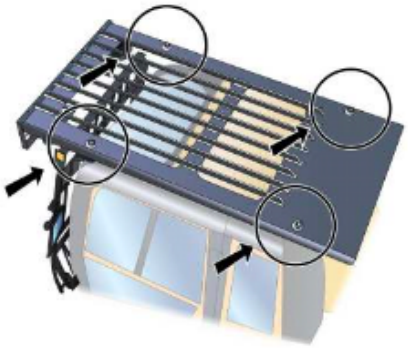
Track condition and tension (if fitted)



Look for leaks under the machine

| | |
|---|---|
| Check hydraulic fluid (brakes and clutch)<br>  | Check transmission oil<br>  |
| Check engine oil<br>  | Check the fuel gauge to make sure the dozer has enough fuel<br>  |
| Check battery water level and terminals<br>  | Check engine coolant<br>  |
| Check air filter indicator<br>  | Check the air tank (if fitted) and drain condensation<br>  |

**What structural checks do you do? For example, safety features and mechanical parts. What checks do you do to the dozer's moving parts and safety features?**

| | |
|---|---|
| Check the condition of attachments<br>  | Look for broken or damaged parts<br>  |
| Check that mounting bolts are attached on the falling object protective structure (FOPS)<br>  | Look for damage to the roll over protective structure (ROPS)<br>  |

**You take out the oil dipstick and the oil looks milky. What does this mean?**

There may be water leaking into the engine oil. There may be water in the sump or the engine may need repairs. Check with your supervisor. The engine should not be operated.

**What is the danger when pumping up a tyre on a split rim wheel? (Rubber tyred machines only)**

Do not stand in front of the wheel. The locking rim could fly off and hit you. You could be injured or killed.

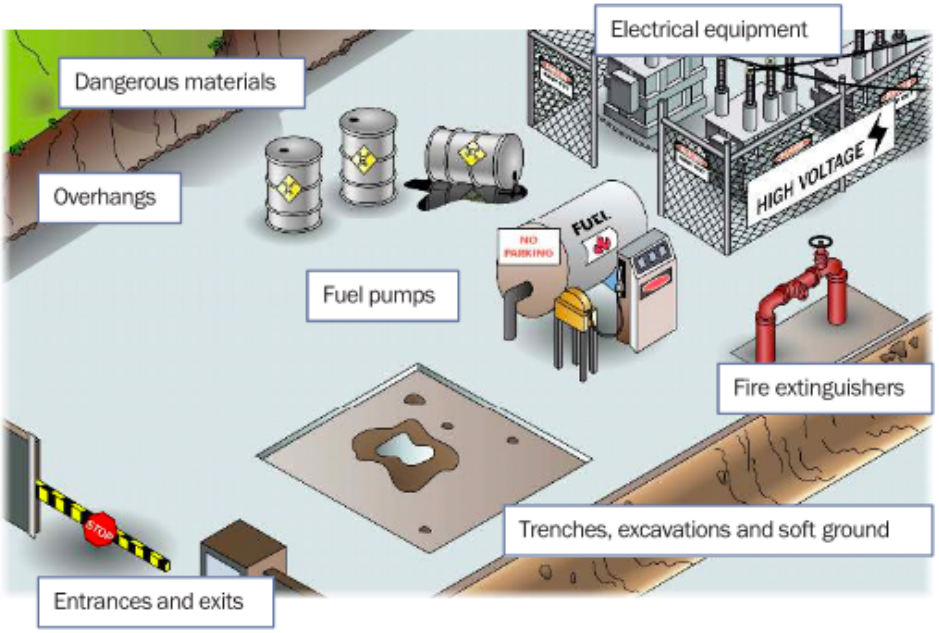
WARNING:
This job may need to be done by an authorised fitter.
Check with your supervisor.

**How can you pump up the tyre on a split rim wheel safely?**

Never stand in front of the wheel. Use a gauge with a chuck. Inflate the tyre in a cage (if available) or stand to one side.

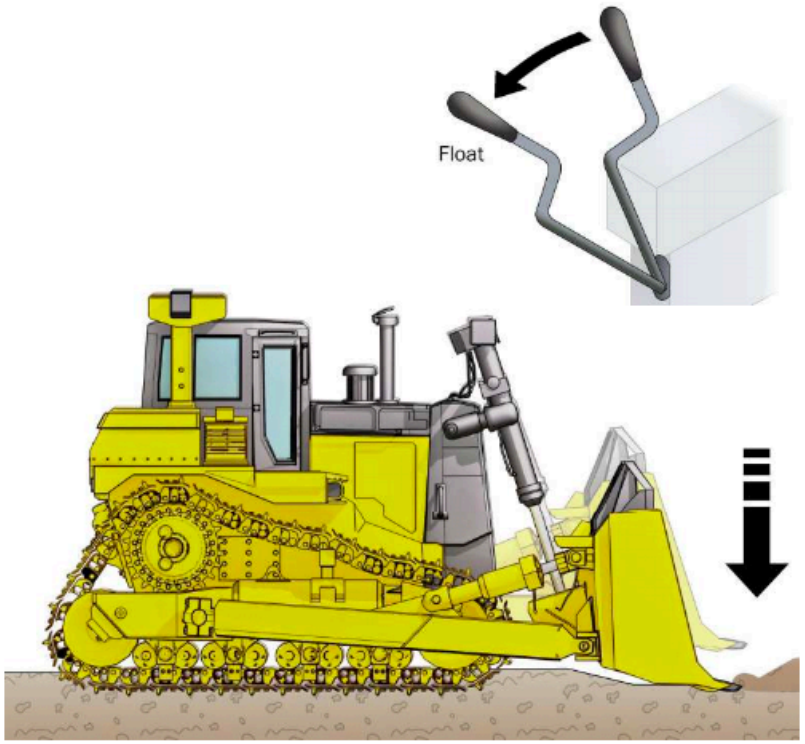
**Where would you not park the dozer?**

Always park in a safe place on firm, level ground. Do not park near:



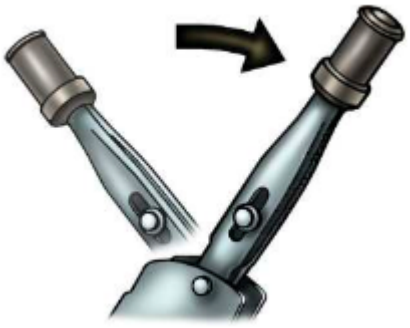
**What do you do with hydraulic attachments before shutting down the dozer?**

Lower the attachment and release hydraulic pressure by placing the lever in the float position.




**How do you shut down the dozer?**

1. Make sure the park brake is on.



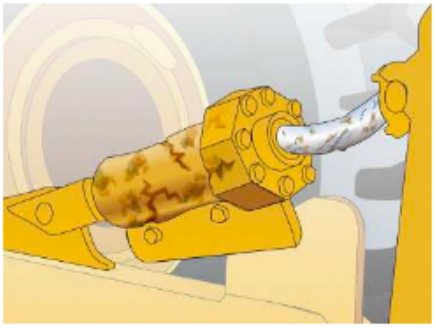
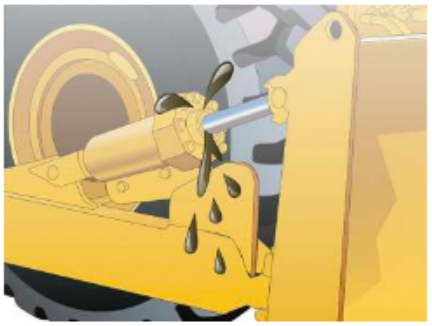
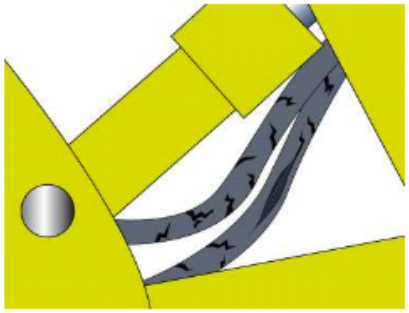
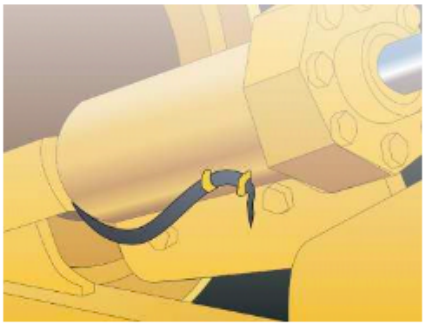
2. Make sure the transmission is in neutral or park.


3. Turn off the ignition and remove the key.

Note:
Idle the engine first to let it cool down. If you don't idle a turbocharged engine, the turbocharger will wear faster.

**What problems do you check the hydraulic system for?**

Look for:

| | |
|---|---|
| Damaged or bent hydraulic rams  | Leaks  |
| Cracked or split hydraulic hoses  | Loose connections.  |

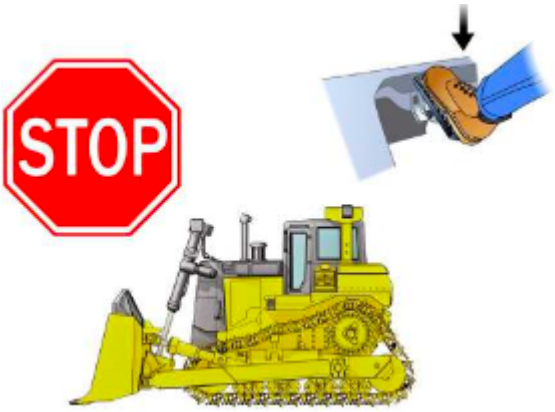
**What must you do if you find any fault with the dozer?**

| | |
|---|---|
| 1. Tag out the equipment and DO NOT USE IT.   | 2. Record the problem in the logbook.   |
| 3. Report the problem to a supervisor.  | |

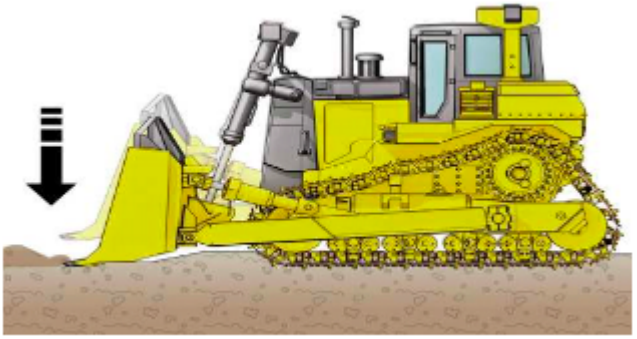
**What kinds of tests should you do before using the dozer for earthmoving?**

You should:

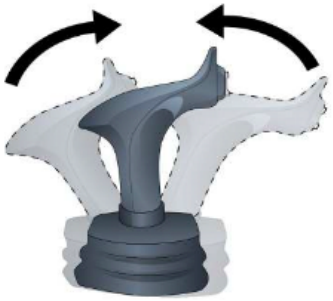
Test brakes




Test attachment movements

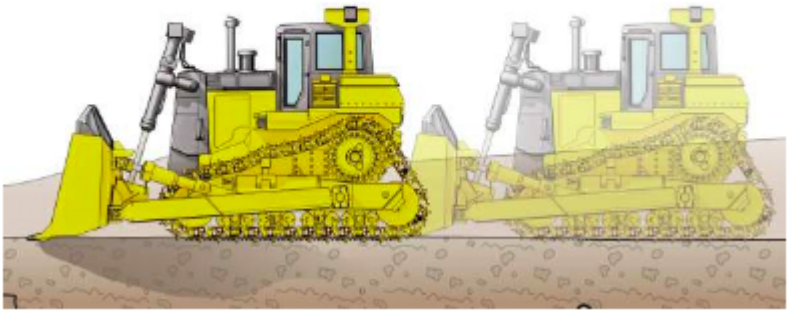


Test steering



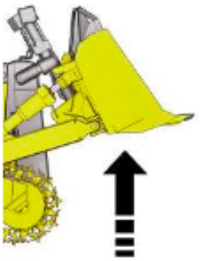
Test controls

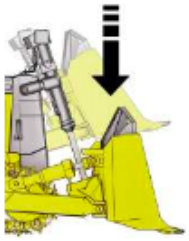

Drive the dozer a short distance to test its function



**Some of the standard hand signals are shown here. What does each of these signals mean?**

| Stop | |
|---|---|
| Motion | Hand signal |
|   |  |

| Attachment raise | |
|---|---|
| Motion | Hand signal |
|  |  |

| Attachment lower | |
|---|---|
| Motion | Hand signal |
|  |  |

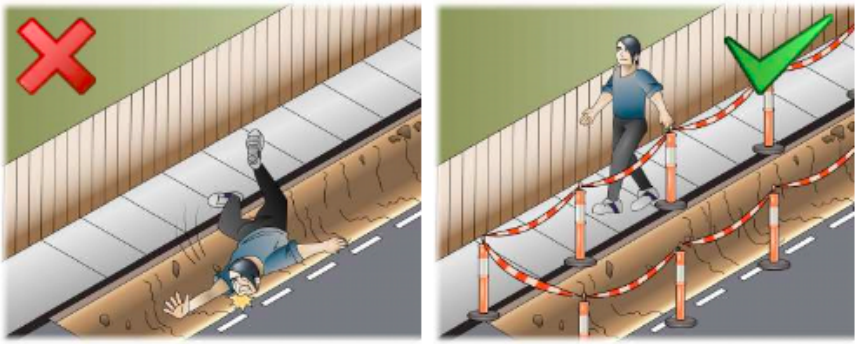
| Travel and traverse | |
|---|---|
| Motion | Hand signal |
| Indicate the direction you want the machine to go |  |

**What is the danger of driving next to a trench?**

The dozer might tip over and fall into the trench, or the edge of the trench might cave in.

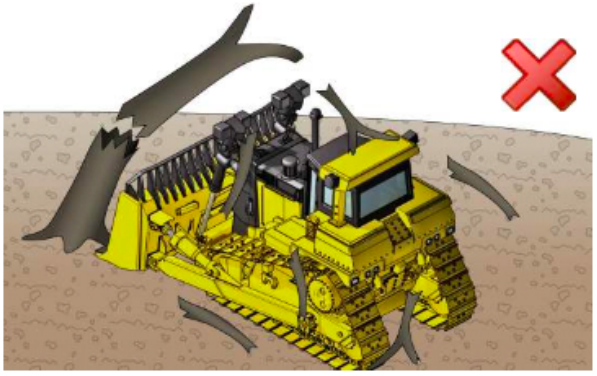
**There is a trench near a pedestrian footpath. How can you stop people falling into the trench?**

Put up barricades, guard rails or fencing. Use signs to warn people of the danger.



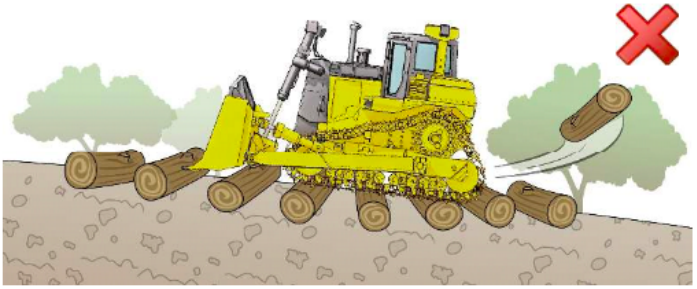
**Why is it dangerous to push a tall, dead tree over using a dozer without a falling object protective structure (FOPS) fitted?**

Branches could break off and fall on to the dozer, or fall on to you.



**You are pushing trees over. What is the danger if you drive over fallen trees?**

Logs are bumpy and can be slippery. You might lose control of the dozer.



**What is the danger of working when it is dark or difficult to see?**

It's harder to see hazards. In the dark it is harder to tell distances.

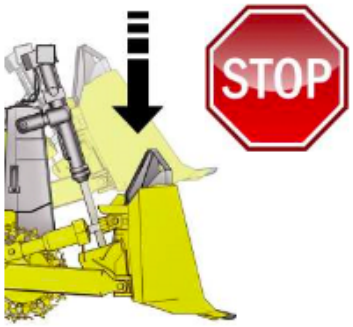
**How do you safely get in and out of the dozer's cabin?**

Always use 3 points of contact facing the machine. For example, use two hands and one foot or two feet and one hand.

**You are using the dozer for demolition work. What extra protection do you need?**

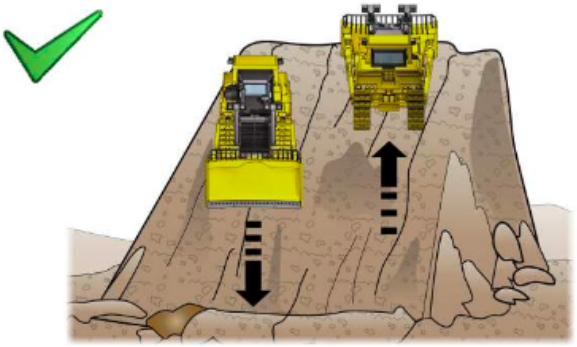
A falling object protective structure (FOPS).

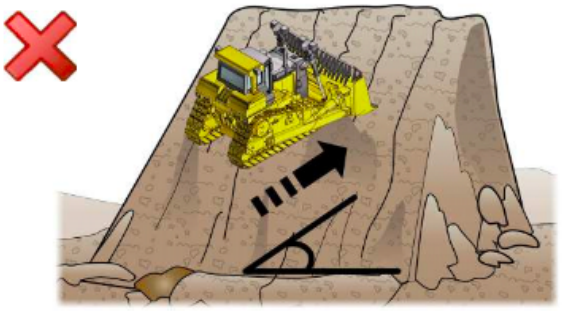
**The blade is raised and a hydraulic hose starts to squirt fluid. What do you do?**

| | |
|---|---|
| 1. Stop working. Lower the attachment to the ground.<br>  | 2. Remove the key<br>  |
| 3. Tag out the machine.<br>  | 4. Report to your supervisor. Have the hose replaced.<br>  |

**Which way should you travel when driving on steep sloping ground?**

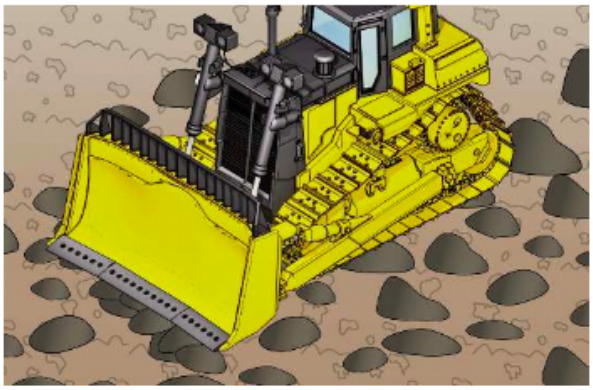
Go straight up or down the hill, not at an angle





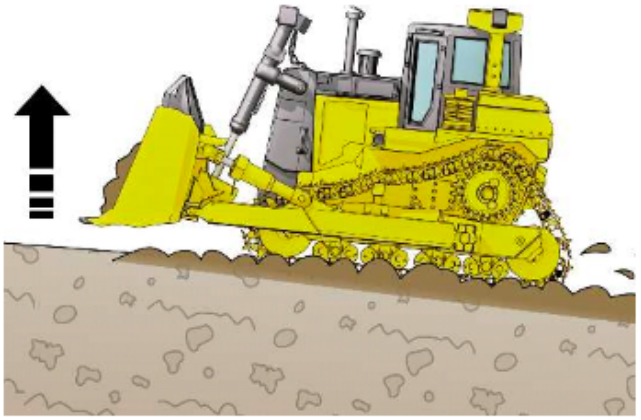
**You are using the dozer and ripping rocks. The tracks are slipping. How can you increase traction?**

Try raising the ripper until the tracks or tyres grip.



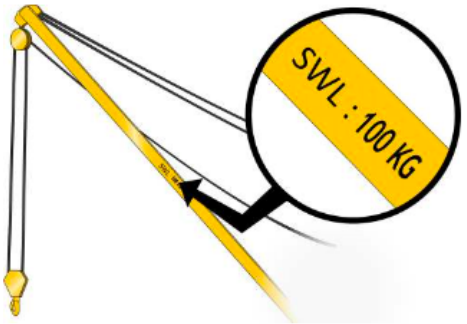
**You are dozing soft or muddy dirt and the tracks start to spin. What can you do to get more grip?**

Raise the blade so you are not pushing as much material.



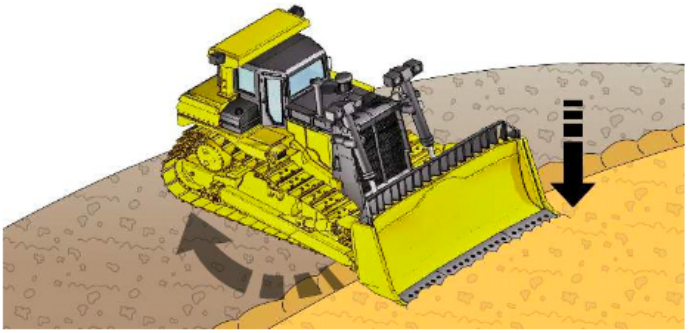
**Your dozer has a sideboom (pipe layer)attached. How do you find out the safe working load (SWL)?**

Check the load plate or SWL marking on the side boom.




**How do you stop the dozer from drifting sideways on a sloping surface?**

Turn the dozer into the grade and lower the blade.



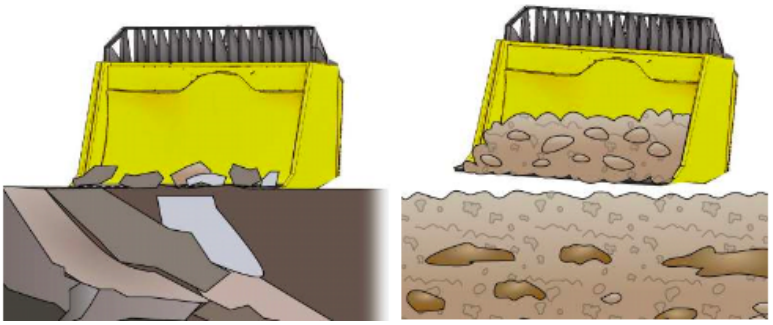
**How do you use the dozer as a crane to lay pipes?**

The dozer needs a side boom with an approved lifting lug.

- Check the SWL
- Find out of the weight of the load
- Choose the right slings and gear
- Ask someone to help you and use a tagline.


**Which is harder to excavate, top soil or clay? Why?**

Clay. Clay is denser and does not break up as easily as top soil.

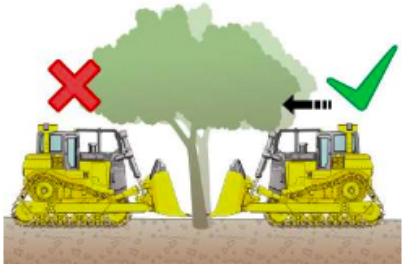


**How do you safely clear trees?**

1. Inspect the tree for overhead dead branches.

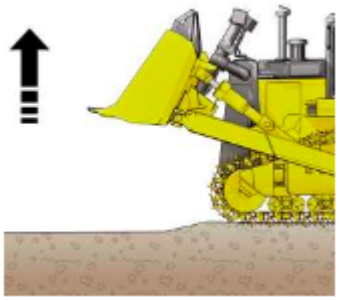
2. Check which way the tree is leaning.

3. Don't come in under the lean. Move the machine to the other side.



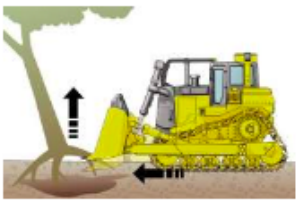
4. Use the low gear.

5. Lift the blade to a safe working height.

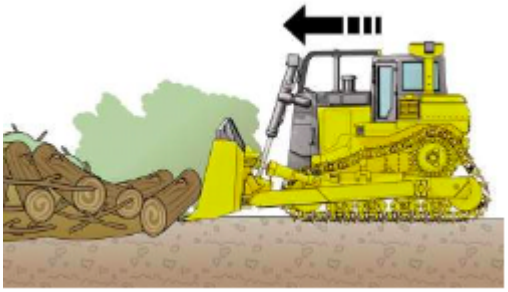


6. Push the tree in the same direction as the lean.

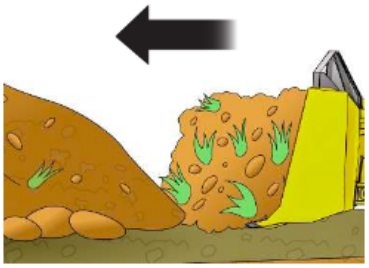
7. Stop as soon as the tree starts to free fall and reverse quickly to stop the roots coming up underneath you.



8. Move the timber to the dump area or pile (windrow).

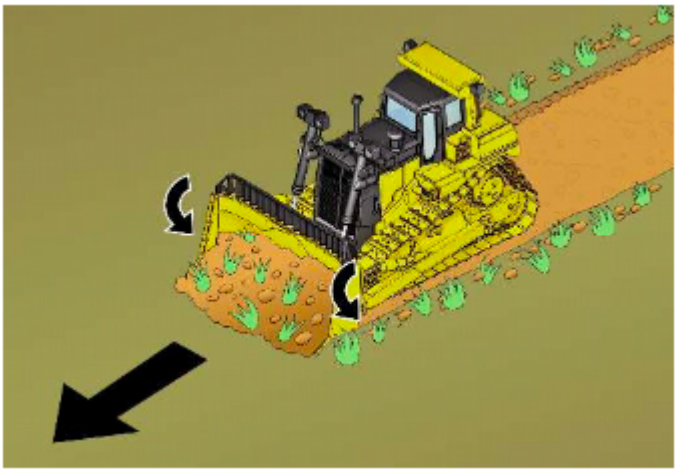


9. Backfill any holes in the ground.



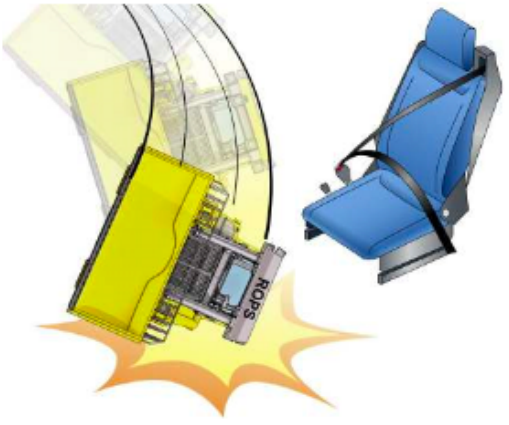
**How do you cut and fill to level out soil?**

Tilt the blade forwards a little. Drive forwards and the blade will push the soil from the high spots and fill out the low spots.



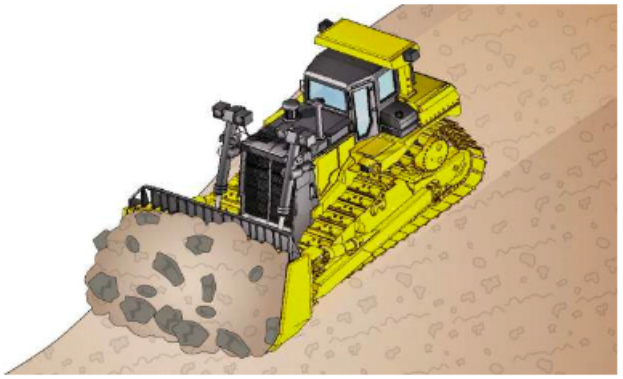
**Which safety devices on a dozer protect you from being crushed if it rolls over?**

The roll over protective structure (ROPS) and a seat belt protect you. Always wear the seat belt when using a dozer. Always keep the doors closed (full cabin types).



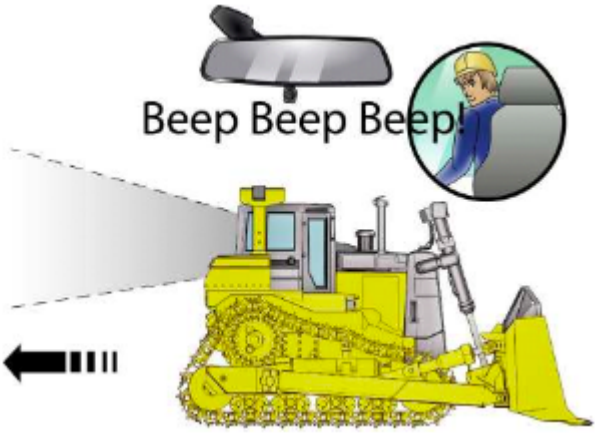
**You will move a load downhill. Is it easier to move a full blade or half bladeload?**

A full blade because the load provides more stability.



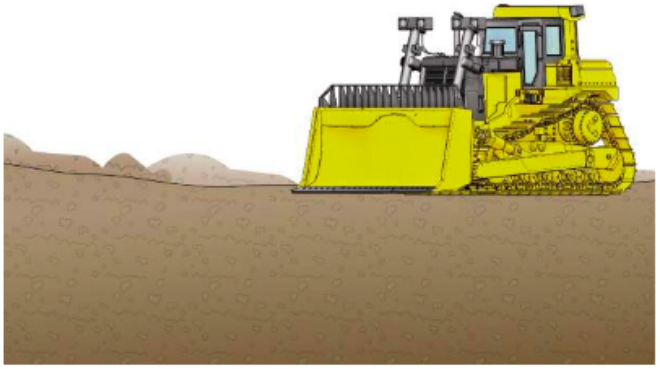
**How do you safely reverse the dozer?**

- Beep/sound horn once (×1) to start the engine (wait 5 seconds)
- Beep/sound horn two times (×2) to go forward (wait 5 seconds)
- Beep/sound horn three times (×3) to reverse (wait 5 seconds). Do this even if you have reversing alarms. Check mirrors. Look over both shoulders and check for a clear path.

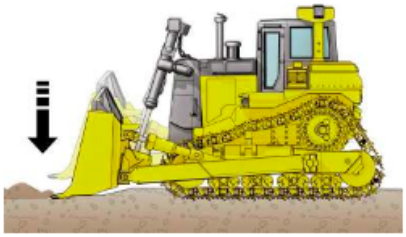



**How do you excavate and stockpile soil?**

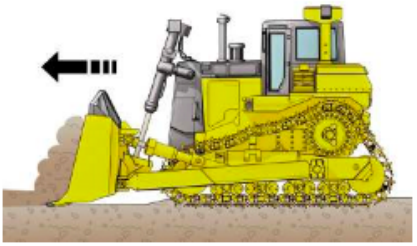
Check your travel path is clear



Set the blade to correct depth and angle

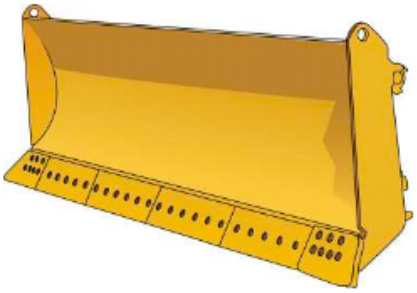


Push the blade forwards until it's full of soil

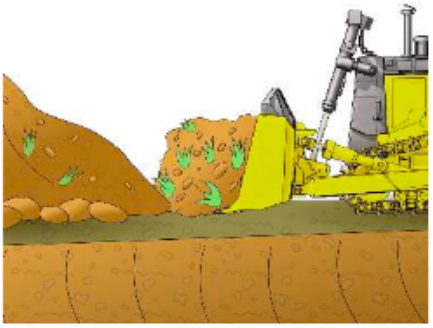


**How do you construct earthworks, for example, a drain?**

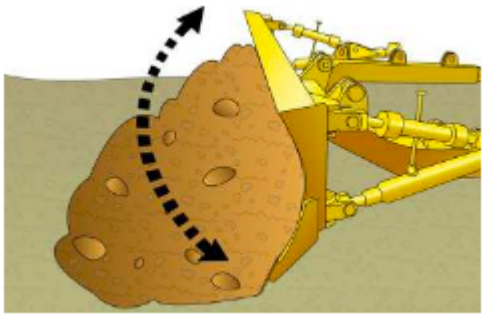
1. Use the straight blade.



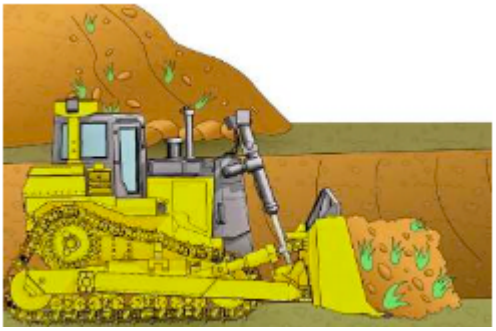
2. Push the top soil or debris to the windrow (pile) at the side of the ditch.



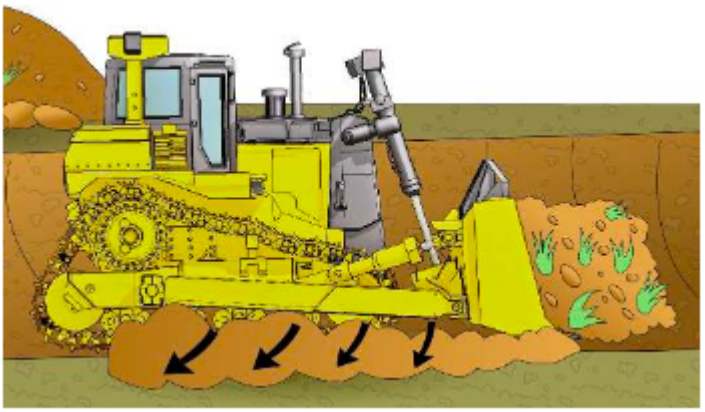
3. Use an angle blade attachment to push the windrow away from the edge of the excavation area.



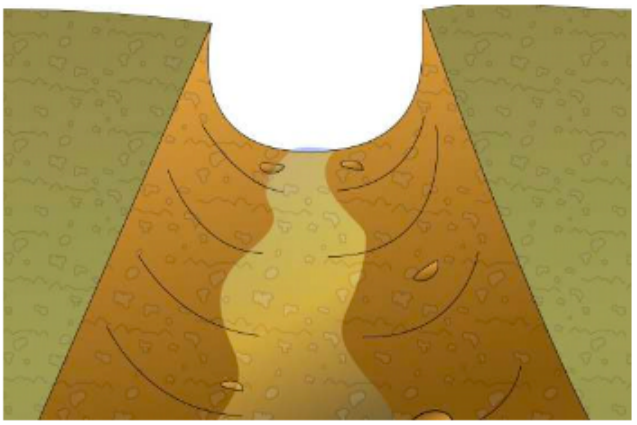
4. Repeat until you have cleared the drain area.



5. Start excavating in the ditch by pushing the dirt longways. Continue to cut the drain until the required width and depth is reached.

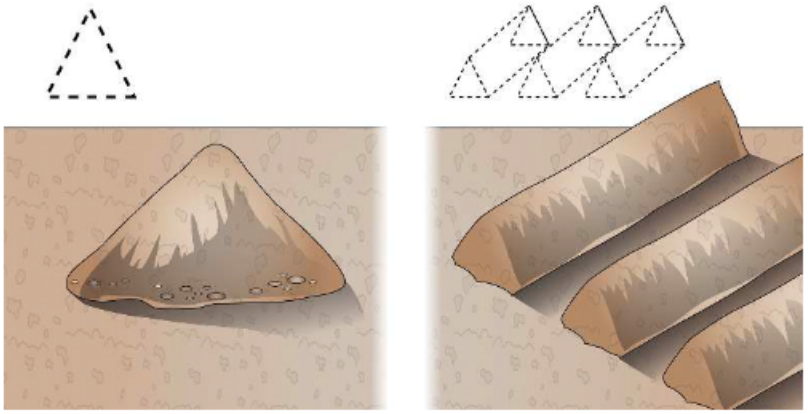


6. Make sure the ditch is clean so water can flow through.



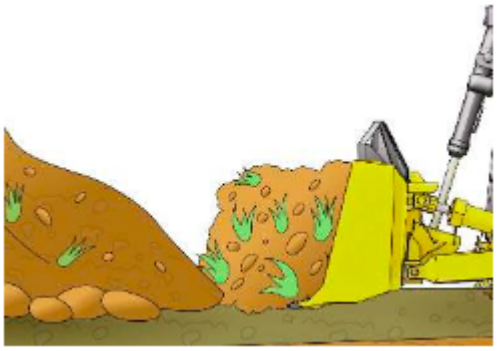
**What are two (2) methods you can use to strip topsoil?**

The stockpile method or the windrow method.

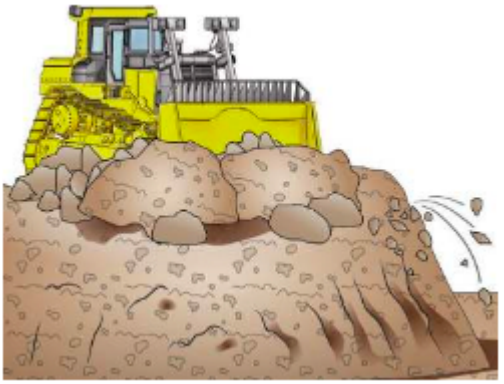


**How do you safely fill out a stockpile?**

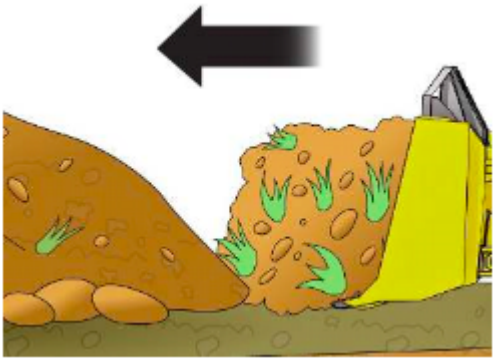
1. Start by filling the area closest to the back of the stockpile area.



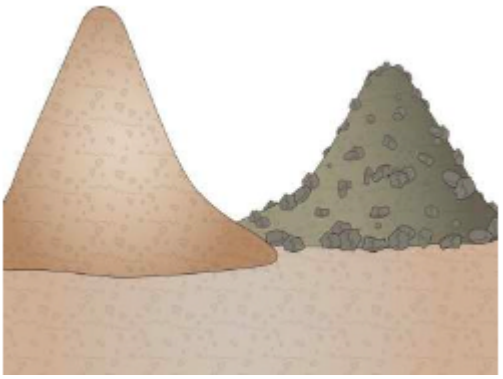
2. Try not to fill too close to the edge. The stockpile might overflow out.



3. Keep filling out the stockpile one row at a time.



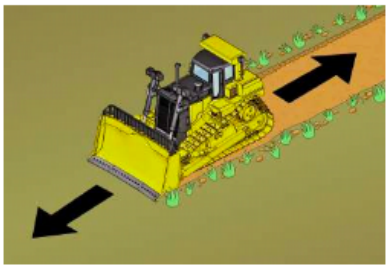
4. Try to keep different kinds of material separate.



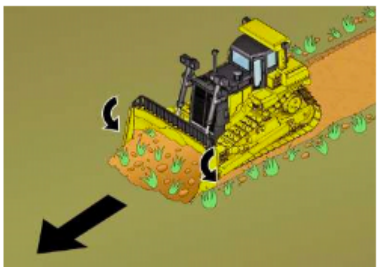
**How do you strip topsoil? Explain the steps.**

1. Mark the area using pegs.

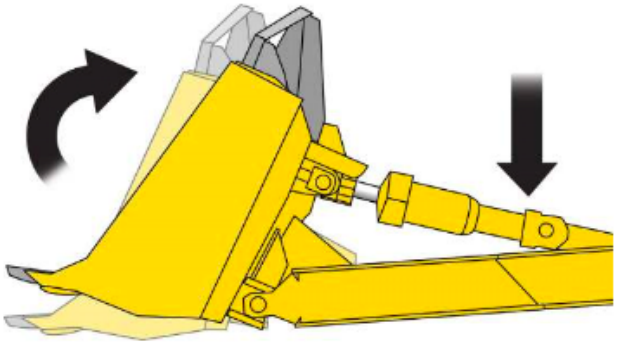
2. Drive forward with the blade on the ground. This will fill in the dips and flatten out the bumps. Reverse in the same line.



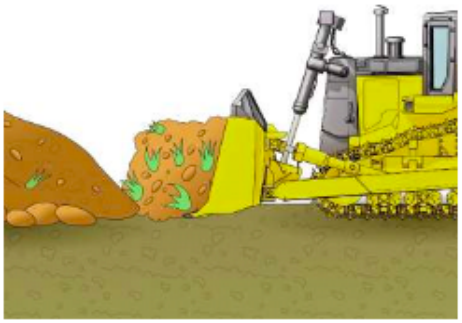
3. Lower the blade down and drive forward to dig into the ground.



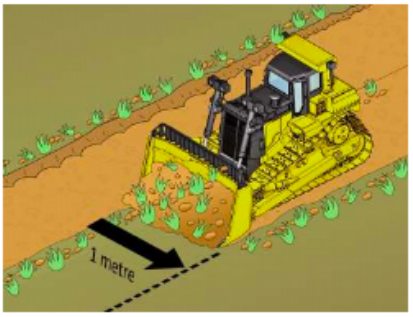
4. Tilt the blade backwards and lower the arms. Keep moving forwards to continue stripping the topsoil.



5. Dump the soil on the stockpile.

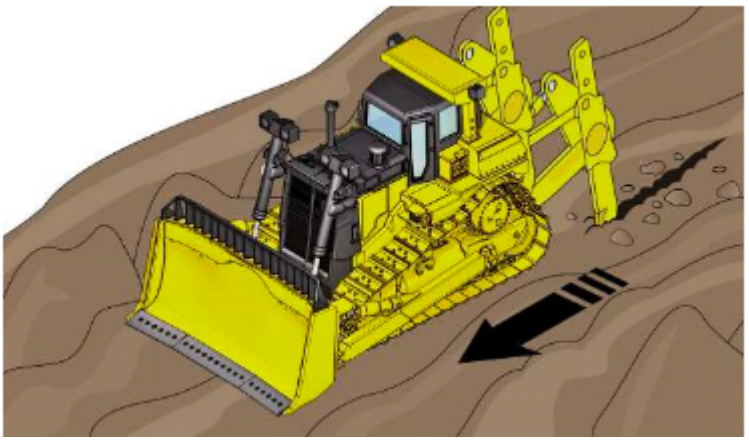


6. Move ½ to 1 metre away and make the next cut.



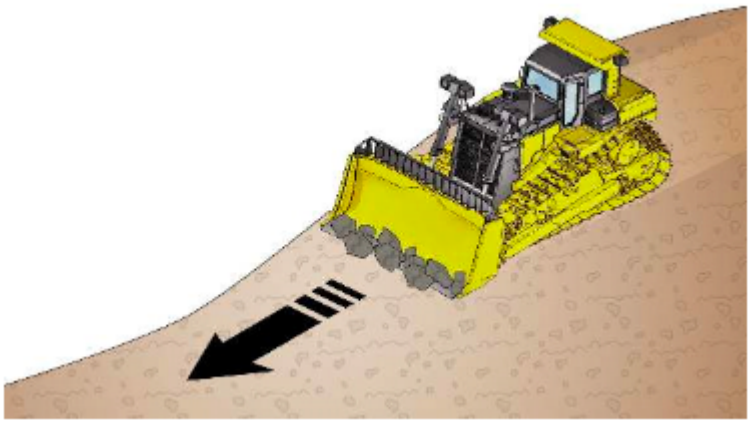
**You are going to rip rocks. Do you rip against the grain or in the direction of the grain?**

In the direction of the grain if possible.



**You are dozing on a slope. Which way should you travel?**

Down the slope is the most effective and safest way.



## 2.2.1 Monitoring System and Alarms

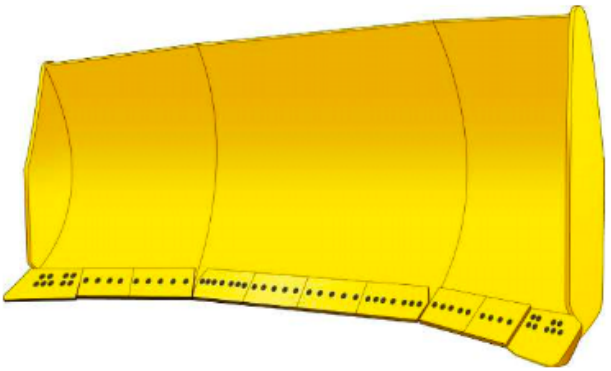
Monitoring systems and alarms help you to know that your dozer is operating safely. The following are examples of symbols that alert you to:

| | |
|---|---|
| **Engine overheating**<br>Symbol on gauge  | **Low engine oil**<br>Symbol on gauge  |
| **Blocked air filter**<br>Symbol on gauge.<br>A blocked air filter can lower engine performance.  | Note:<br>A warning light and an alarm may come on depending on how serious the fault is.<br>Always check the operator's manual for information. |

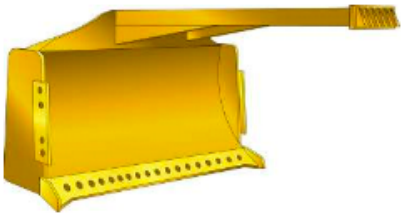
# 2.3 Select, Remove and Fit Attachments

**What are some attachments you might use on a dozer?**

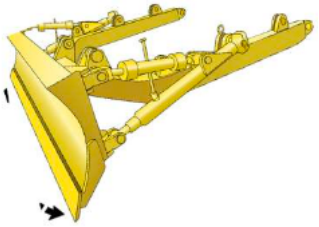
Coal blade



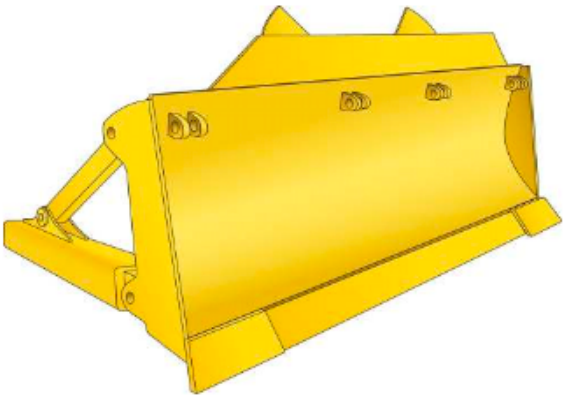
Tree pusher or pusher blade



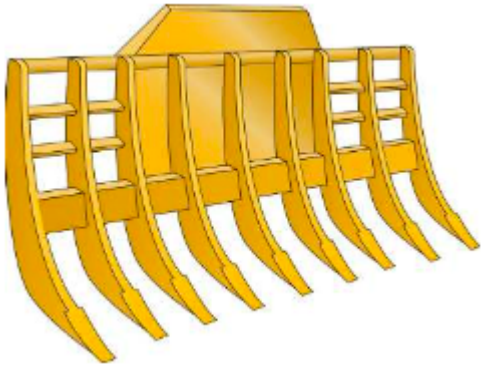
Angle blade



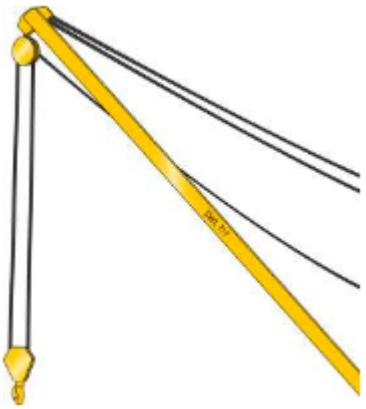
Bull blade



Root rake

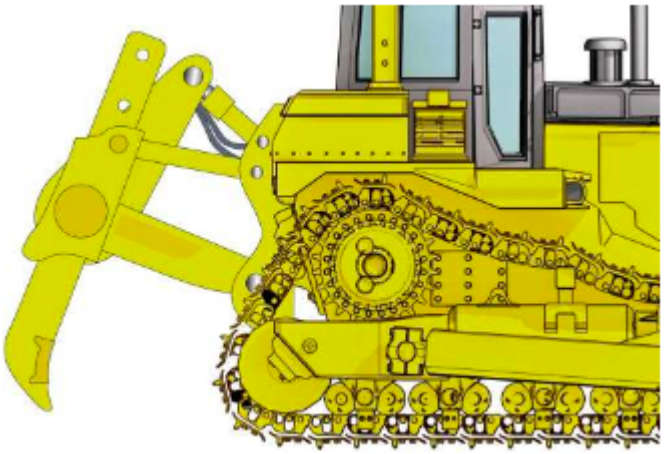


Pipe layer



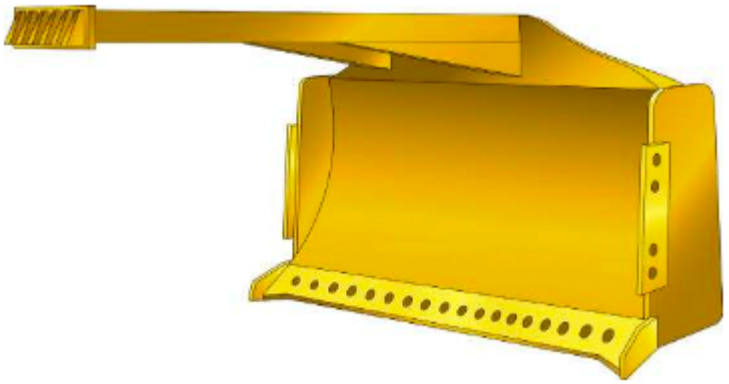
**What attachment do you use to break up and loosen hard rocks?**

The ripper attachments.



**What attachment do you use to push over trees?**

The tree pusher blade.



**Who is allowed to change an attachment on a dozer?**

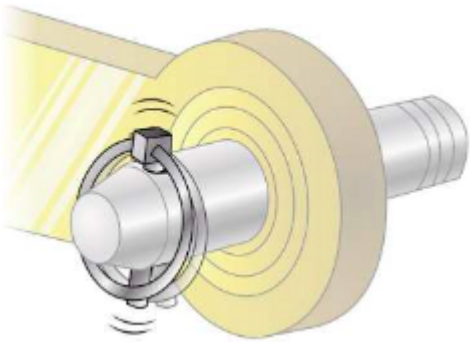
Attachments must be changed by a qualified, competent person. For example, a fitter.

**Before testing the attachment, what should you check first?**

Check for:

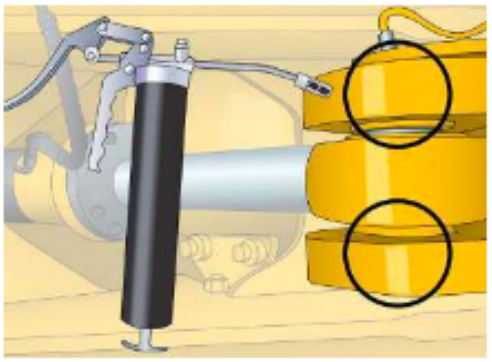
Hydraulic leaks

Loose snap rings and circlips

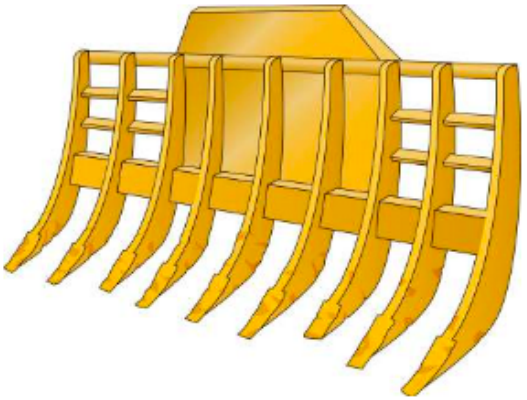


Grease nipples

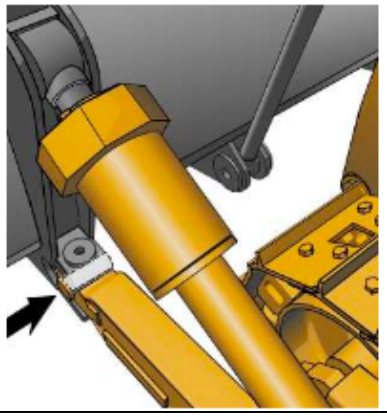
Check grease holes



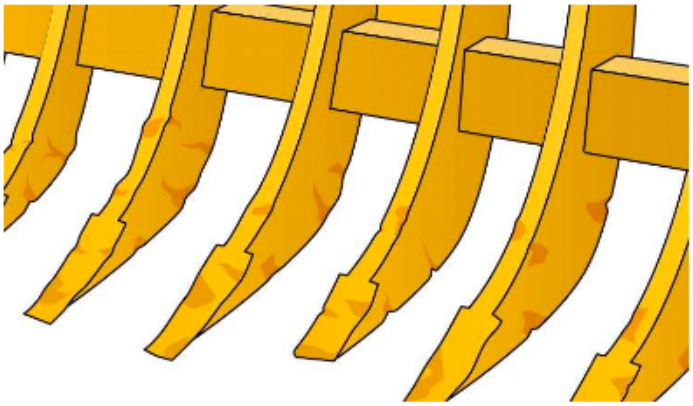
Check the attachment's condition



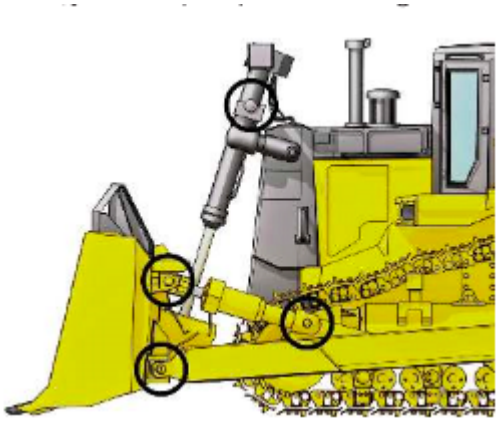
Crowd cylinder is properly connected



Check for broken parts and wear



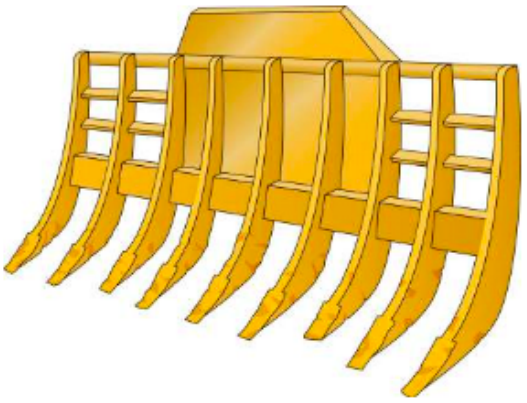
Pins, joints and pivot points are well-greased



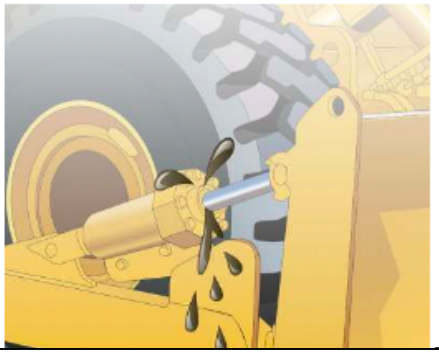
Check connections are secure

**What attachment checks do you do?**

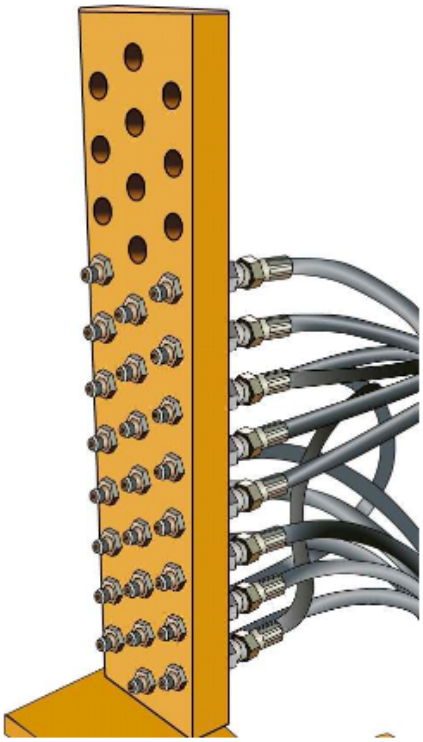
Check for wear



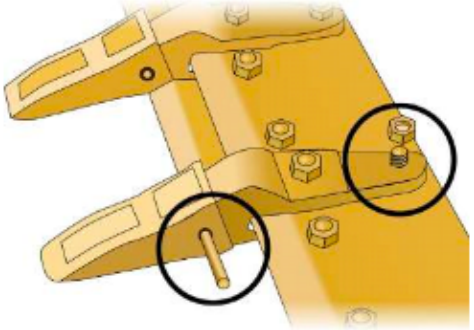
Check for oil leaks from hoses, fittings and hydraulic rams



Grease nipples



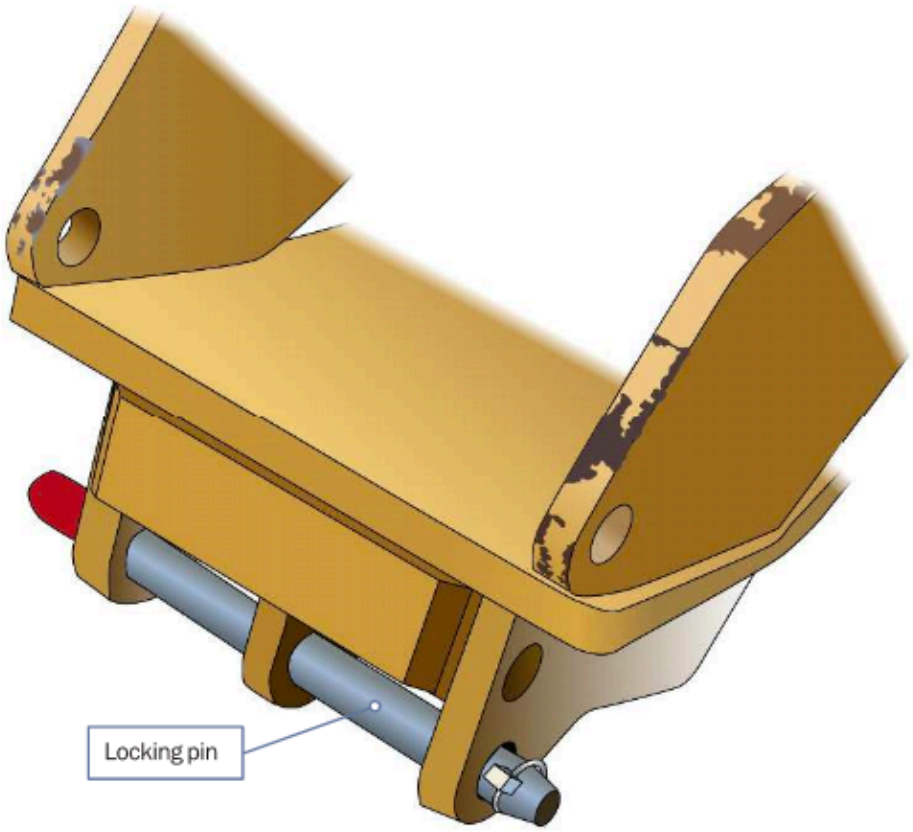
Check for missing pins and keepers



Joints are properly lubricated

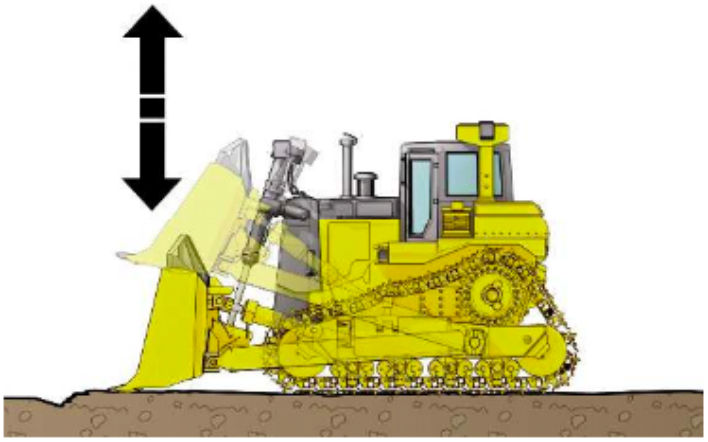
**How do you make sure the attachment is properly secured to the machine?**

Make sure safety pins and clips are there and not loose, and moving joints are not worn



**How do you test the attachment before using it?**

Test all functions of the attachment. For example, lift it up and down.

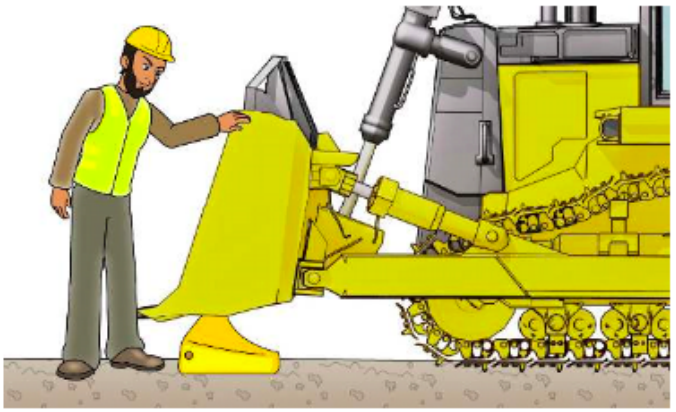


**What do you do if you find a fault while testing the attachment?**

Try to find out what the problem is and fix it. If you can't fix it, do not use the attachment and tag it out.

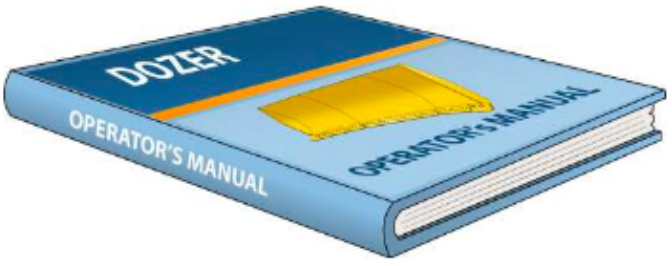

**What should you do when checking under a raised attachment?**

Use something to stop the attachment from falling on top of you. For example, you might use chocks, blocks or safety bars.

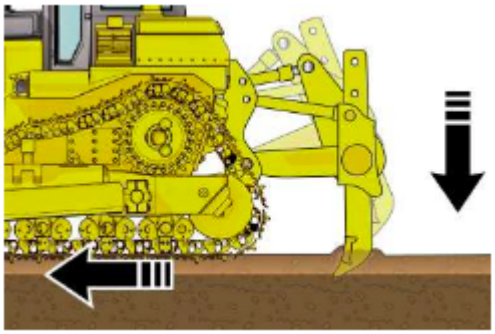
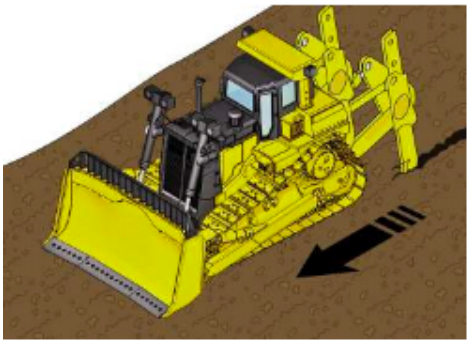
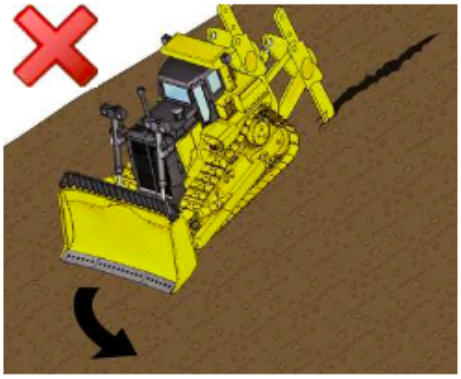
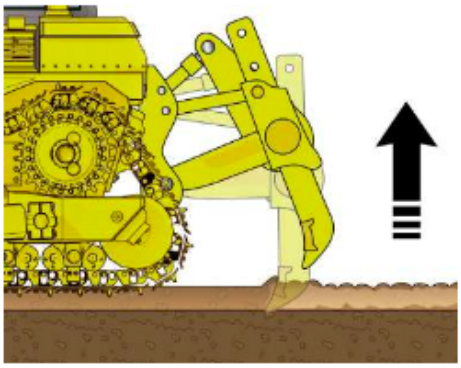


**Where can you find out the limits of the attachment?**

In the operator's manual which should come with the attachment.

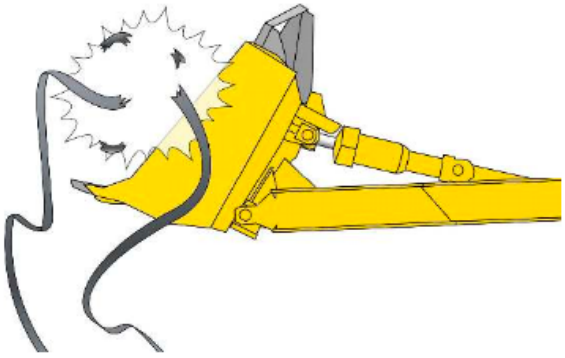


**How do you use rippers to loosen soil?**

| | |
|---|---|
| Lower the rippers while you're moving  | Rip along the grain and down the slope  |
| Don't turn while the ripper is in the ground  | Retract the rippers once you've finished a run  |

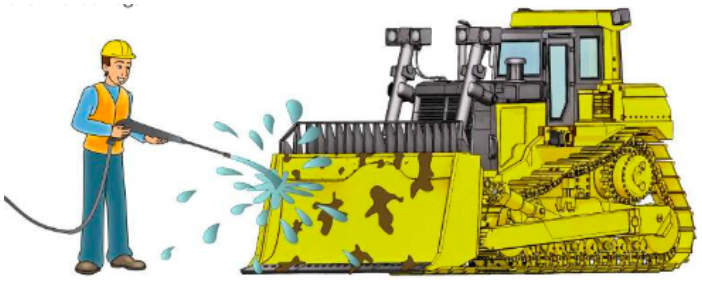
**Can you use a sling around the dozer's blade to hoist loads?**

No, because the sling could be damaged or break.



**What steps should you take when you're finished using an attachment?**

Clean any dirt and grit from the attachment. Block off or cover any hydraulic hoses and check for damage.



**Where do you store the attachment?**

Your worksite should have a designated storage area for attachments. Ask your supervisor or a workmate.

# 2.4 Relocate the Dozer

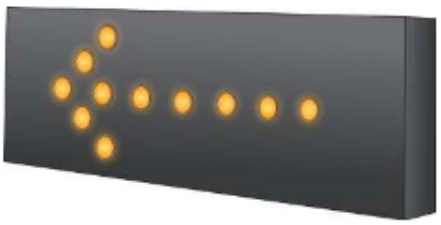
**You are going to move the dozer between worksites. You will be loading the dozer on a public road and will need to control the flow of traffic. Do you need to be qualified to do this?**

Yes, you must be a qualified traffic controller.
For example:
*RIIOHS302D Implement traffic management plan*
This unit covers the competency required to implement a traffic management plan in the civil construction industry. It includes: planning and preparing, setting out, monitoring and closing down the traffic guidance scheme; and cleaning up.


**What is the aim of a traffic control plan?**

The aim of a traffic control plan is to maintain a safe flow of traffic around the work area.


**What signs may be used in a traffic control plan?**

| | |
|---|---|
| Speed limit signs   | Warning signs   |
| Arrow boards  | Portable traffic signals  |

**What equipment may be used in a traffic control plan?**

| | | |
|---|---|---|
| Stop/slow bats   | High visibility vests  | Radios  |
| Barricades  | Cones  | Bollards  |

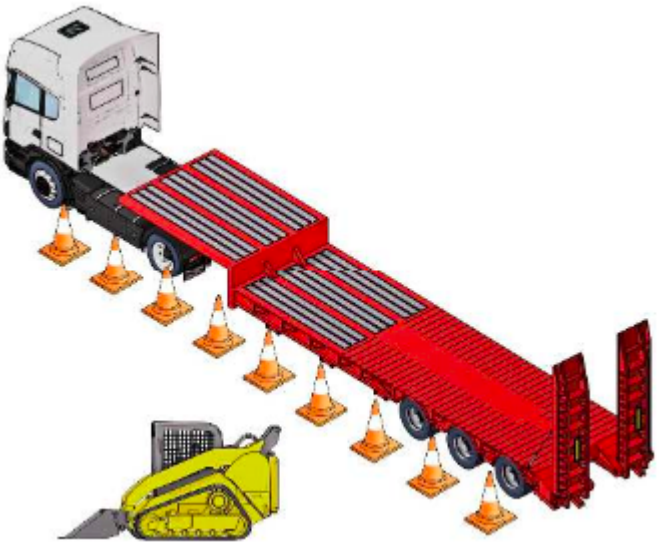
## 2.4.1 Loading and Unloading from Float/Trailer

As the operator of a front end load loader there may be times when you need to assist in loading or unloading the front end loader from a float or trailer. To perform this activity safely you should have completed, or be assisted in the loading/unloading by a person who has completed suitable training in loading and unloading plant. For example unit RIIHAN308F Load and Unload Plant or an equivalent unit would be suitable.

Anyone who loads or unloads a heavy vehicle is responsible for playing their part in the Chain of Responsibility which falls under Heavy Vehicle National Law. As a loader/unloader you have an influence over where and how goods are loaded and therefore have an ongoing responsibility to prevent breaches.

The key responsibilities of a loader/unloader may include ensuring that:

- Loads do not exceed vehicle mass or dimension limits*
- Goods carried are appropriately secured*
- You provide reliable weight information to drivers*
- Load documentation is accurate*
- Delays in loading/unloading are prevented
- Your loading/unloading do not require or encourage drivers to exceed the speed limits or regulated driving hours, fail to meet the minimum rest requirements or drive while impaired by fatigue.

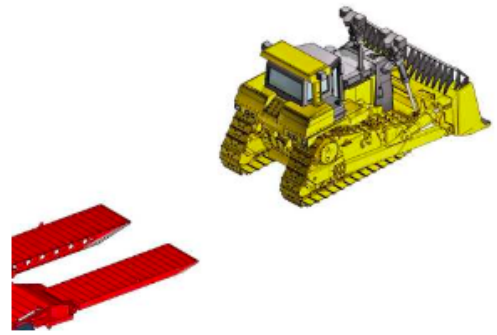


* Not relevant to an unloader

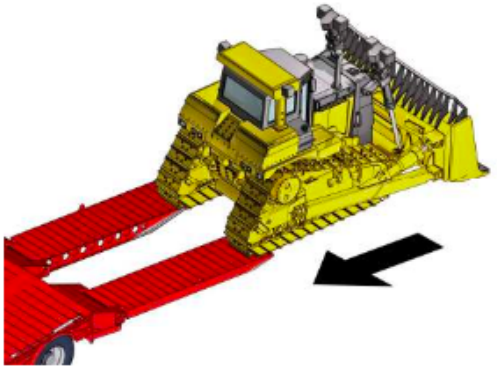
**How do you load the dozer on the float/ transport vehicle?**

After the transport vehicle and dozer have been prepared, take the following steps:

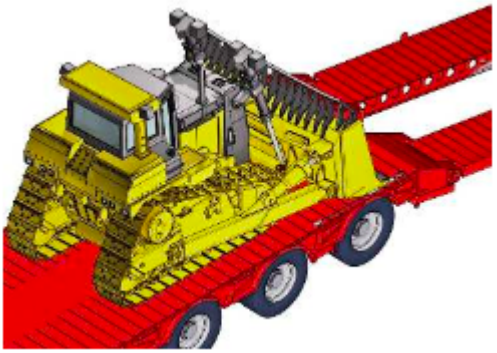
1. Check that the vehicle is ready. You may need to get other materials such as chains and binders.



2. Drive the dozer towards the ramp at the right speed and angle.

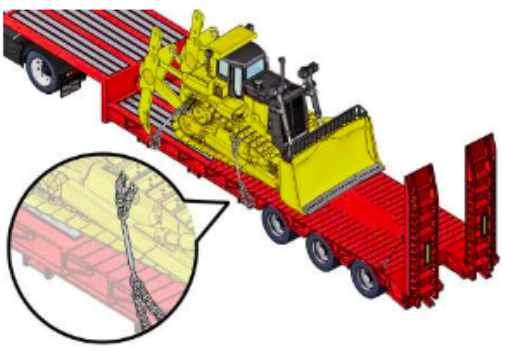


3. Park the dozer on the vehicle.



4. Lower the blade and rippers.

5. Tie down the dozer to secure it on the vehicle.



# 2.5 Conduct Housekeeping Activities

## 2.5.1 Disposing of Environmentally Sensitive Fluid

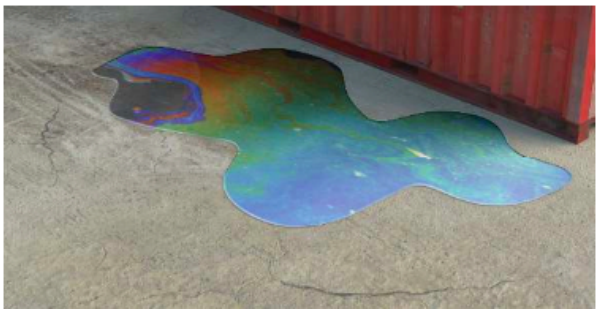
There are times when you will need to dispose of environmentally sensitive fluids. You may have to deal with oil spills or chemical spills.

There are disposal companies who remove used oil, oily water and emulsions, waste grease, filters, rags, brake fluids and coolants.

Oil is a good example of an environmentally sensitive substance that needs to be disposed of properly.

**The damage oil and chemicals can do**

If oil ends up in landfill, it will slowly leach into surrounding land and underground water.
Storm water and sewage, polluted by oil, can cause long term damage to coastal and marine habitats and ecosystems, seabirds, mammals, fisheries and people.



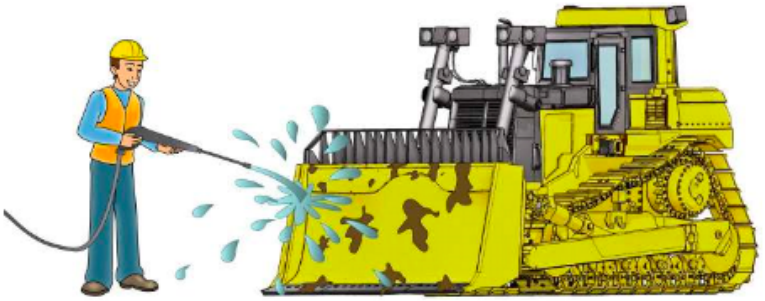
## 2.5.2 Clean Up

### 2.5.2.1 Recycling Items

Many environmentally sensitive items can be recycled. Items such as batteries, oil and gas cylinders can sometimes be recycled and reused.
Some oils can be taken to a recycling centre. With oil, bring your materials to the recycling centre in a clean, plastic container with a lid. The original container is a good container to return the oil in.

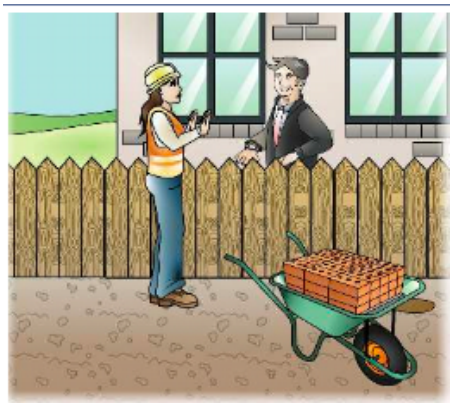
### 2.5.2.2 Pressure Clean

You may need to pressure clean the wheels, tyres, or attachments.



**After you've finished the job, what should you do?**

Tell people who live in the area that the work is finished



Clean the job site

Put any rubbish in the correct bin and recycle what you can

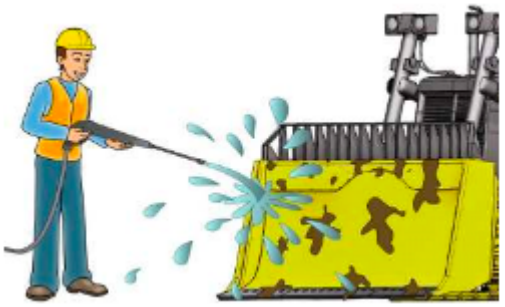
**What is the danger of leaving earth and rocks around the work site?**

Someone might trip on a rock and be injured. Rocks left on the road can damage cars.

**What instructions do you follow when cleaning up?**

The environmental management plan and site procedures.


**What do you have to clean on the dozer?**

| | |
|---|---|
| Clean the windows and cabin.<br>  | Clean the attachment.<br>  |

**What do you do with other equipment and tools you've used?**

Clean tools and equipment, and put them back in their place.

**Where do you record the work done when repairing and maintaining service equipment during cleaning up the service area?**

Enter all repairs and maintenance on equipment in the site specific record book or system.



**Where do you record the materials, parts and lubricants used when servicing machines and equipment?**

In the site specific record books or record keeping systems.