

RIIMPO323E Conduct Civil Construction Dozer Operations Learner Guide



Version 1.1

Table of Contents

1.1 Introduction	4
1.1.1 What is a Dozer?	4
1.1.2 Dozer Components	5
1.2 Site Policies and Procedures	6
1.3 Work Instructions	7
1.3.1 Reading and Checking Your Work Instructions	7
1.3.2 Work Method Statements	8
1.3.3 Project Quality Requirements	9
1.3.3.1 Plans, Drawings and Sketches	9
1.3.3.2 Site Product Characteristics	9
1.3.3.3 Checking Level and Grade Requirements	10
1.3.4 Civil Construction Sequences	10
1.3.5 Basic Earthworks Calculations	11
1.4 Emergency Procedures	12
1.4.1 Emergency Shutdown of Equipment	12
1.4.2 Evacuation	12
1.4.3 First Aid	12
1.4.4 Fire Fighting Equipment	13
1.4.5 Unexpected Incidents	13
1.5 Hazard Identification & Control	15
1.5.1 Identify Hazards	15
1.5.2 Control Hazards	16
1.5.2.1 Personal Protective Equipment (PPE)	17
1.5.2.2 Traffic Control Barricades and Signage	18
1.5.3 Environmental Protection Requirements	18
2.1 Choose and Check Plant and Equipment	19
2.1.1 Select a Dozer Attachment	19
2.1.2 Fit and Remove Attachments	21
2.1.3 Conduct Routine Checks	22
2.1.3.1 Pre-Start Checks	22
2.1.3.2 Operational Checks	23
2.1.3.3 Test Dozer Attachments	23
2.1.4 Recording and Reporting Faults	24
2.2 Drive to the Work Area	24
2.2.1 Assess Materials	26
2.2.2 Calculate Safe Working Loads	26
2.3 Safe Operating Techniques	27
2.3.1 Safe Operating Speeds	27
2.3.2 Safe Travel Speeds	28
2.4 Apply Appropriate Dozer Operating Techniques	28
2.4.1 Dozing Procedures	29
2.4.2 Operate Attachments	29
2.4.3 Dozing Techniques	30
2.4.3.1 Driving	30
2.4.3.2 Pushing	31
2.4.3.3 Levelling	31
2.4.3.4 Blade Control and Application	32
2.4.3.5 Manoeuvring	32
2.4.3.6 Braking	33
2.4.4 Dozer Operations and Tasks	33
2.4.4.1 Cutting and Filling	33
2.4.4.2 Battering	34
2.4.4.3 Benching and Backfilling	34
2.4.4.4 Stockpiling	34
2.4.4.5 Cutting Drains	35
2.4.4.6 Ripping	35
2.4.4.7 Stripping and Spreading of Materials	36
2.4.4.8 Bulk Excavation	36

2.4.4.9 Site Clean-Up	36
2.5 Monitoring Systems and Alarms.....	37
2.6 Adjust Techniques to Meet Changing Conditions	38
2.6.1 Monitor and Check for Hazards	38
2.6.2 Reporting Hazards	40
2.7 Checking Completed Work	40
3.1 Park and Shut Down the Dozer	40
3.1.1 Park the Dozer	41
3.1.2 Shut Down the Dozer	41
3.2 Post-Operational Checks	42
3.2.1 Reporting Faults	43
3.3 Prepare the Dozer for Relocation	44
3.3.1 Move the Dozer between Worksites.....	44
3.4 Clean the Dozer and Carry Out Routine Maintenance	45
3.4.1 Carry Out Maintenance Tasks	45
3.4.1.1 Vehicle Refuelling Procedures	46
3.4.2 Processing Maintenance Records.....	47
3.5 Clean Up After Operations.....	48
3.5.2 Cleaning and Storing Attachments.....	48
3.6 Process Written Records	49

1.1 Introduction

This course is based on the unit of competency **RIIMPO323E Conduct Civil Construction Dozer Operations.**

You will learn about:

- ◆ Planning and preparing for operations.
- ◆ Conducting routine checks.
- ◆ Operating the dozer.
- ◆ Selecting, fitting and removing attachments.
- ◆ Relocating the dozer from site to site.
- ◆ Conducting operator maintenance.
- ◆ Cleaning up.



1.1.1 What is a Dozer?



A dozer is a self-propelled tracked or wheeled vehicle. It has a blade mounted at the front end and a ripper mounted at the rear.

On a civil construction site a dozer will be used for:

- ◆ Stripping or spreading topsoil and materials.
- ◆ Cutting and filling.
- ◆ Battering.
- ◆ Bulk excavating.
- ◆ Stockpiling.
- ◆ Cutting drains.
- ◆ Benching and backfilling.

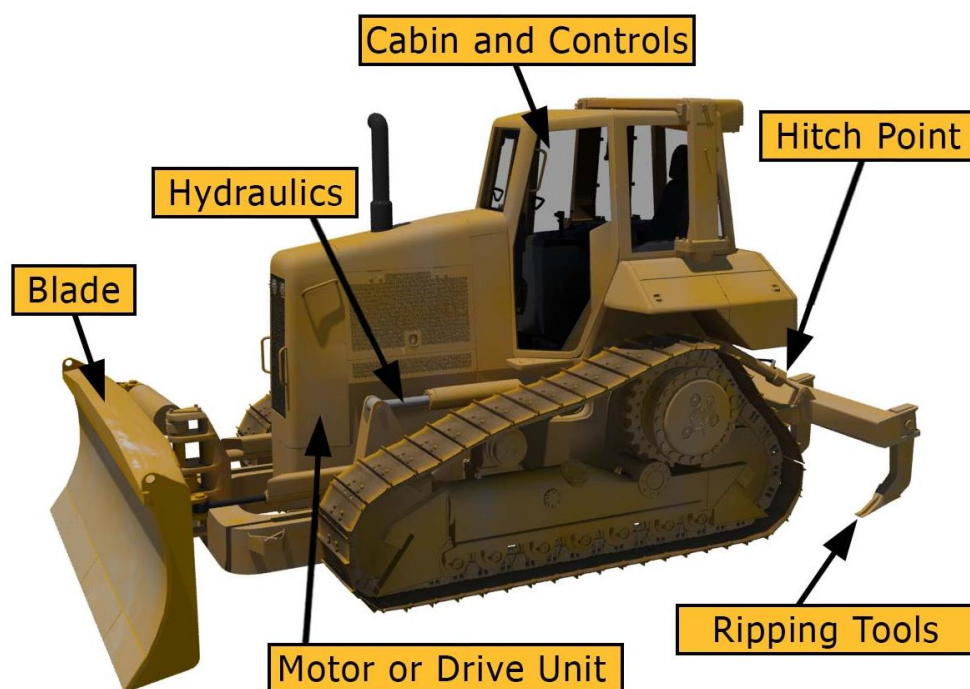
The dozer may also be used for:

- ◆ Land clearing and constructing firebreaks.
- ◆ Track rolling.
- ◆ Ripping and scraping.
- ◆ Push loading.
- ◆ Towing equipment.
- ◆ Working in tandem.
- ◆ Winching.
- ◆ Boxing.
- ◆ Mixing materials.



1.1.2 Dozer Components

The following diagram and table outline the basic components of a tracked dozer:



Part or Component	Explanation
Blade	The pushing implement on the machine.
Hydraulics	Generic name given to all hydro-static drive units including hoses and rams.
Motor or Drive Unit	Engine of the machine.
Cabin and Controls	Part where operator sits and operates the machine. Controls including joystick or control levers, transmission controls, brakes, emergency stop controls.
Hitch Point	Point where linkage between different parts occurs.
Ripping Tools	Points, tips, boots, or blades designed to tear or break hard materials. These may need replacing regularly.

For the exact details of the components for the machine you are operating, check your operator's manual.

1.2 Site Policies and Procedures



You must follow all safety rules and instructions when performing any work. If you are not sure about what you should do, ask your boss or supervisor. They will tell you what you need to do and how to do it in a safe way.

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

Operations documentation includes:

Site Details

The information and safety requirements of the workplace environment (where you will be working).

Hazard Details

Any hazards in the work area or related to the work. This could also include instructions on how to handle dangerous or hazardous materials.

Task Details

Instructions of what the work is or what you will be doing (this can include diagrams or plans). Also instructions on how to safely do the job.

Faulty Equipment Procedures

Isolation procedures to follow or forms to fill out.

Signage

Site signage tells you what equipment you need to have, or areas that are not safe to be in.

Emergency Procedures

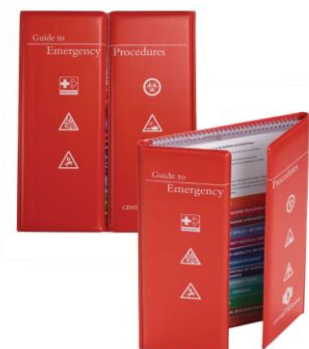
Instructions on what to do in emergency situations, for example if there is a fire, accident or emergency where evacuation or first aid is needed.

Equipment and Work Instructions

Details of how to operate plant and equipment and the sequence of work to be done.

Your worksite will also have instructions for working safely including:

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



1.3 Work Instructions

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

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

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



You also need to make sure you have all of the details about the kind of work you will be doing:

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



1.3.1 Reading and Checking Your Work Instructions



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

Procedures help to make sure that all work is done in a safe way, without damaging equipment or putting people in unsafe situations. They also help to make sure that work is done in the correct order and doesn't interrupt or get in the way of other work that is happening on the site.

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

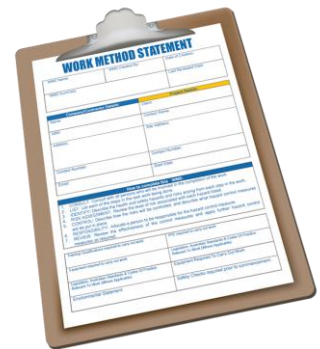
If you don't know where to get your instructions or you can't understand them, you can ask your boss or supervisor. They will tell you where to find your work instructions and explain what they mean.

1.3.2 Work Method Statements

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

These statements can also be known as Safe Work Method Statement (SWMS), Job Safety Analysis (JSA) or Safe Operating Procedure (SOP).

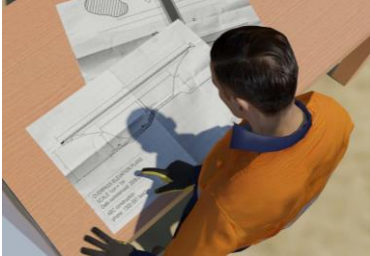
Work method statements are a great tool for organising your work activities. They help to make sure you have completed everything and will also outline the details of all tools, equipment and coordination needed with other workers relating to your job. Make sure all of these are available and ready before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



1.3.3 Project Quality Requirements

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

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



They can include:

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

1.3.3.1 Plans, Drawings and Sketches

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

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



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

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

1.3.3.2 Site Product Characteristics

Make sure you are familiar with the site product or materials before you start to move them around. Have a look at the composition of the materials to see what kind of equipment you will need to move them, and what techniques to use.

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



1.3.3.3 Checking Level and Grade Requirements

You need to check the floor clean up procedures to make sure you are able to achieve the specified levels and grades. These will be outlined in the project details and your instructions.

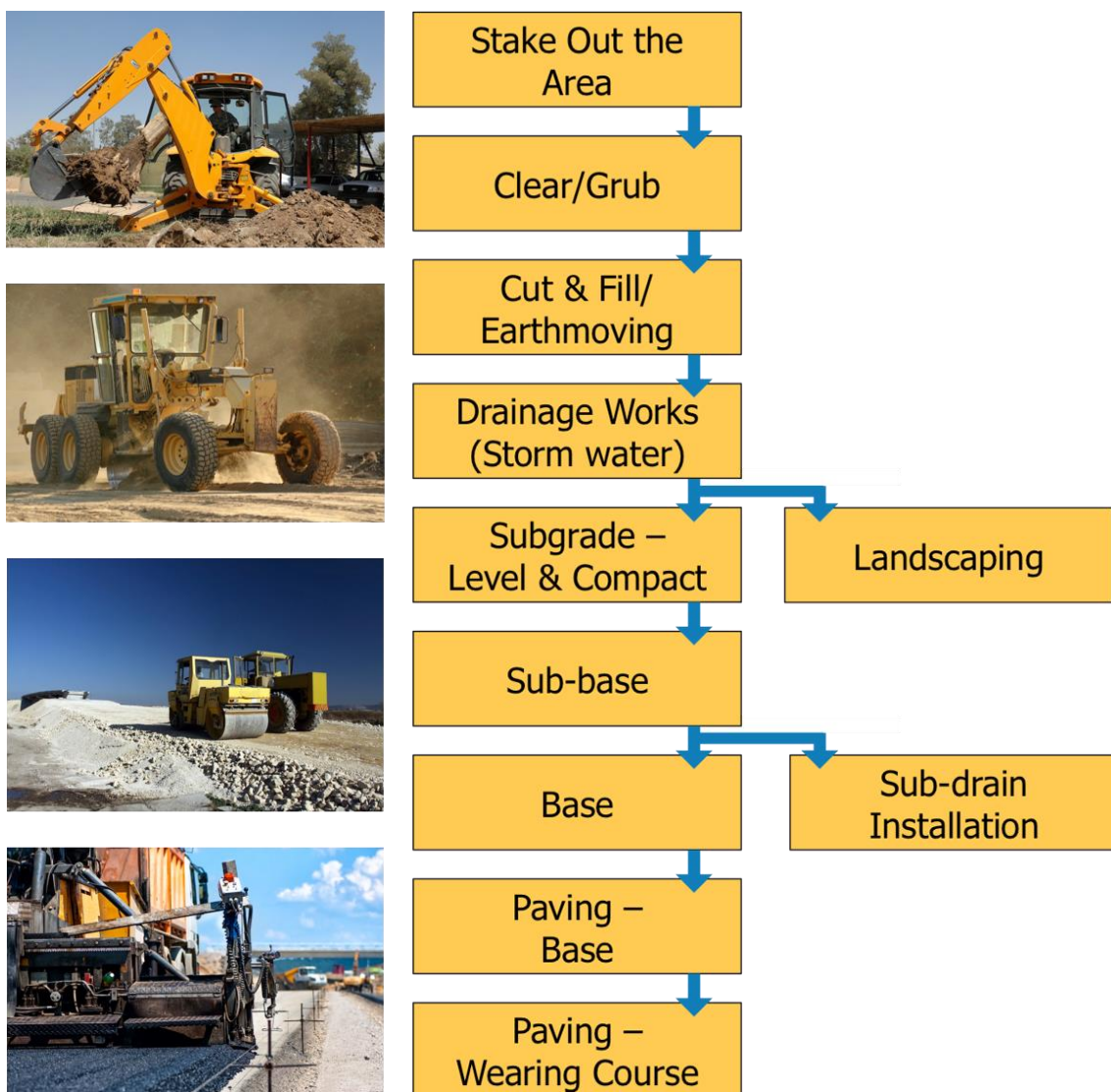
This could also include other areas such as the pad, road, ramps, and bench clean up procedures.



1.3.4 Civil Construction Sequences

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

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



1.3.5 Basic Earthworks Calculations

As a dozer operator, the 2 main calculations you will need to be able to apply are for Area and Volume.

Area can be calculated using the following formula:



Area = Length (L) x Width (W)

For example:
40 square metres (40m²) may be marked out as:

- ◆ 10 x 4 metres.
- ◆ 5 x 8 metres.
- ◆ 20 x 2 metres.

Area	= L x W	Area	= L x W	Area	= L x W
	= 10m x 4m		= 5m x 8m		= 20m x 2m
	= 40m²		= 40m²		= 40m²

Volume can be calculated using the following formula:



**Volume =
Length (L) x Width (W) x Height (H)**

For example:
An area with a length of 10 metres, a width of 4 metres and that is 2 metres deep will be 80 cubic metres (80m³) of material.

Volume	= L x W x H
	= 10m x 4m x 2m
	= 80m³

1.4 Emergency Procedures

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



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

1.4.1 Emergency Shutdown of Equipment

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



1.4.2 Evacuation



Things to remember are:

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

1.4.3 First Aid

First Aid is the quick care given to an injured or ill person.

Every site will have a First Aid Officer. If somebody needs first aid you must tell your supervisor or First Aid Officer. Do not try to give first aid if you have not been trained.

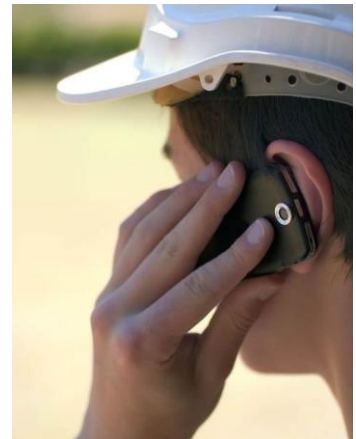


1.4.4 Fire Fighting Equipment

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

Steps for using a fire extinguisher:

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



The **PASS** system:

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

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

1.4.5 Unexpected Incidents

As a dozer operator you could be required to recognise the following unexpected incidents or accidents, and respond accordingly:



Out of Control Vehicle

This requires the application of the emergency stop system. The blade of the dozer can also be lowered to assist in stopping the machine but this should only be done when an immediate stop is required as it can cause significant damage to the blade or the dozer.



Contact with Electrical Services

Stay within the cab (unless the vehicle has caught fire) contact the power supplier and then your supervisor and wait for the electricity to be turned off. If possible, try to break contact.

Turn off the engine and avoid all contact with the cabin frame.

Contact the electrical supply authority immediately.

If the vehicle has caught fire, carefully open the door without contacting any metal objects. Keeping both feet together, jump as far away from the machine as possible at a tangent towards either the front or rear of the dozer to avoid any possible exploding material. Shuffle away approximately 10m away (Note: if you fall over do not get up roll away)

It is recommended that an exclusion zone of 200-300 metres is put in place around the vehicle. Keep all workers clear of the area until an all clear is given.

Collision

Always try to avoid a collision in any manner practical for the situation and site conditions. If it puts you at more risk by avoiding a collision, allow the collision to take place but brace yourself if possible.

Once a collision has occurred, render any first aid that is necessary if you know how and wait for supervisors and team leaders to arrive onsite. Do not move the vehicles until given permission to do so and an investigation has taken place.



Rollover

Stay within the cab of the vehicle. Never try to jump clear. Dozers are protected with a ROPS (Roll Over Protection System) so you are safer to wait for the dozer to stop rolling over before trying to climb free.

Rollover is one reason why seatbelts should be worn at all times. Once you start to roll, it is too late to put on your belt.

1.5 Hazard Identification & Control

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

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

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



1.5.1 Identify Hazards



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

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

When you start checking for hazards, make sure you look everywhere. A good way to do this is to check:

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

Some hazards you should check for in the work area:

- ◆ Overhead and underground services.
- ◆ Uneven, soft, slippery or unstable terrain.
- ◆ Trees.
- ◆ Fires.
- ◆ Bridges.
- ◆ Excavations.
- ◆ Buildings.
- ◆ Traffic.
- ◆ Embankments.
- ◆ Cuttings.
- ◆ Hazardous materials.
- ◆ Structures such as site offices and scaffolds.
- ◆ The weather and environment.
- ◆ Other workers or site visitors.
- ◆ Pedestrians and other public traffic.
- ◆ On site vehicles, plant, equipment and machinery.
- ◆ Poorly maintained or faulty equipment.
- ◆ Hazards from components of the dozer.
- ◆ Road surface and edge solidity.
- ◆ Handling characteristics of the dozer.
- ◆ Effects of the materials as you work with them.
- ◆ Chemical hazards such as fuel, chemicals, contaminants, gases or dusts.



1.5.2 Control Hazards

After you have found hazards or dangers you need to work out how bad they are:



- 1. What is the chance that the hazard will hurt someone or cause damage?**
- 2. If it does happen, how bad will the injury or damage be?**

The Hierarchy of Hazard Control is the name given to a range of control methods used to eliminate or control hazards and risks in the workplace. The Hierarchy has 6 levels.

It is important to understand what each level in the Hierarchy stands for and how they can be applied to your work.

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

It is important to think about all of the options available when deciding on the best hazard controls. You may need to use more than 1 control measure to bring the risk level down to an acceptable level.

Check the situation after you have applied a control measure to see if more controls, or different controls are needed to make the job safe. If more controls are needed, make sure they are applied before you start or continue the work.



1.5.2.1 Personal Protective Equipment (PPE)

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

It includes:



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

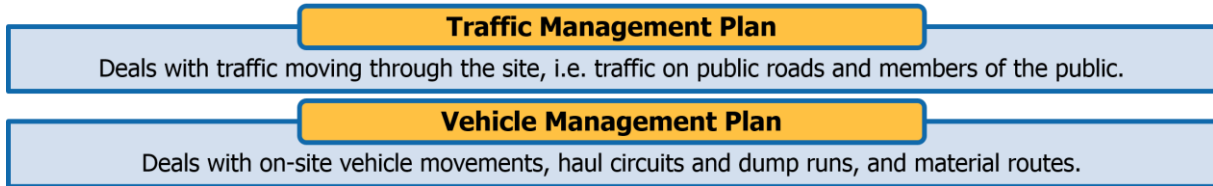
Make sure any PPE you are wearing is in good condition, fits well and is right for the job.

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

1.5.2.2 Traffic Control Barricades and Signage

In some cases you may need to isolate the work area. Set up barricades and signage to warn others that you are working in the area and that it is dangerous for them to come too close.

On worksites it is often necessary to control the movement of traffic around and through the site. To do this there are 2 different types of traffic management plans:



In the traffic or vehicle management plan, signs and the distances between signs will be listed. Reading the plans will show you where particular signs need to be placed.

Signs and barriers may include:

- ◆ Danger or warning signs like speed limits, 'workmen ahead' or 'reduce speed'.
- ◆ Flashing lights.
- ◆ Barricades and fences.

1.5.3 Environmental Protection Requirements

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

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

- ◆ Waste management.
- ◆ Water quality protection.
- ◆ Flora and fauna (Animals and Plants)
- ◆ Noise control.
- ◆ Vibration control.
- ◆ Dust management.



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

2.1 Choose and Check Plant and Equipment

Once you have confirmed your job requirements you need to choose the right equipment and attachments to get the job done. Dozers can be used to prepare areas for other work or to finish surfaces.

When choosing plant and equipment you need to think about:

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

Information about technical capabilities and limits can be found in the operator manuals for each item.

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



2.1.1 Select a Dozer Attachment

Selecting the correct attachment that is most suitable to the task, materials and conditions is essential in order to complete the task safely and efficiently.

Attachments, or implements as they are sometimes called, are added so the dozer can carry out different tasks more efficiently.



Some dozer attachments include:

Attachment	Description and Use
Blades	May include: ◆ Push blades, as the name implies, are used primarily for pushing. ◆ Angle blades, used for land clearing, backfilling, grading and ditch cutting. ◆ Bull blades are broad and flat, specifically designed for pushing and levelling. ◆ Coal blades are high, long blades with wings for capturing coal and other types of rock. ◆ Clearing blade, a v-shaped blade that makes clearing land easier. ◆ Power angle tilt blades can angle and tilt at the same time, clearing a wider path than other blades.
Rippers	Generally used at the back of the dozer to rip materials.
Stick Rakes	Used for picking up sticks and small logs, brush or debris.
Root Rakes	Larger and more robust than stick rakes for collecting large roots or rocks.
Winches	Can be attached either at the front or back and is used for pulling or winching activities.
GPS	Used for guiding and keeping the dozer on particular paths.
Tree Pushers	A metal protrusion attached to the dozer for pushing the tree over.
Cable Ploughs	Normally fitted behind the dozer and pulled along for laying telecommunication cables, fibre optics water pipes and cable protection and drainage pipes.
Cable Drums	Used with the cable plough to control the rolling out of the cables.
Stump Ploughs	Used for clearing stumps.

If any attachments are used, ensure they meet the manufacturer's specifications and are approved for use with your dozer. Any approved attachments should be listed in your operator's manual.

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

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

You will find this information in the operator's manual for the dozer and the operator's manual for the attachment. Otherwise you may need to check the workplace equipment procedures for your site.



2.1.2 Fit and Remove Attachments



Once you have decided that the attachment is right, you need to attach it securely using approved attachment points and methods. Each attachment will have its own requirements for how and where it is fitted on the dozer. You can find this information in the operator's manual or manufacturer's instructions.

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

Fitting Attachments

- ◆ Collect any equipment that may be needed, including hand tools and PPE.
- ◆ Park the dozer in the appropriate location.
- ◆ Check the attachment is in good working order.
- ◆ Connect the attachment, making sure all bolts, nuts and locking pins are correctly applied.
- ◆ Refer to the operator's manual or speak to your supervisor if you have any concerns with attachments.



Incorrectly fitted attachments can damage the dozer or the worksite and could void any insurances or warranties on the vehicle.

Removing Attachments

- ◆ When removing attachments it is necessary for you to remember safety first.
- ◆ Ensure the dozer is safely parked and the attachment is safe to remove.
- ◆ Check that all points of attachment have been undone before removing the attachment.
- ◆ Heavy attachments should be removed with good manual handling techniques. Use team lifts as much as possible.
- ◆ Clean the attachment and place in storage according to worksite procedures.



2.1.3 Conduct Routine Checks



Before you use any piece of plant or equipment, you need to conduct routine checks to make sure it is safe to use. Check the machine logbook before you start your inspection to see if there are any faults that still need to be fixed before you can use the dozer.

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

Routine checks are made up of:

Pre-Start Checks

Visual checks that are made before you start the equipment.

Operational Checks

Checks of all functions once the machine has been started.

Generally, routine checks are performed at the start of each day or shift.

You can use an inspection checklist to keep a record of the checks you have made.

2.1.3.1 Pre-Start Checks

Pre-start checks are done before the engine is started. Walk around the dozer and look for anything that is out of the ordinary.

Part or Component	What to Check
Structure	Check the general condition of the dozer. Look for any obvious signs of wear and tear. Check for oil or other fluid leaks.
Tracks or Wheels.	Check the track condition and surface. Check the condition and air pressure of any tyres to make sure they are within the manufacturer's specifications.
Fluids and Lubrication	Check that the oils (engine, transmission, hydraulic) and fuel are at the right levels. Check that the water or other approved coolant is at the right level. Transmission fluid needs to be checked in accordance with the manufacturer's specifications. Check that parts are lubricated to ensure smooth operation.
Engine	Check condition and security of battery. Check electrolyte levels. Check for any obvious signs of damage or wear.
Hydraulic Rams and Hoses	Hydraulic rams and pressure hoses are checked for splits, leaks, fractures, bulges and bent piston rods.
Attachments and Ancillary Equipment	Check the condition and security of any attachments.
Decals and Signage	Check that all decals and signage are present on the machine.
Windows	Check that the windows are clean and you have good visibility from the operator's chair.
Cabin	Check that the seat and safety belt are in good condition. Check that the cabin is clean.
Service History and Logbook	Check the machine hour meter, manufacturer's recommendation and logbook to find out if the dozer needs to be serviced. You can also check the instruments or computer for this information on later models.

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

2.1.3.2 Operational Checks

Operational checks are made once the engine is started.



Climb to the operator's seat using 3 points of contact at all times (2 hands and 1 foot or 2 feet and 1 hand). This is the safest way to climb in and out of the dozer.

Adjust the seat until comfortable and make sure you have maximum visibility.
Secure your safety belt.

Start up the dozer following the manufacturer's instructions.

You will need to let the engine idle for the required amount of time. Depending upon the individual machine this idle time could range from 3 to 10 minutes.

Controls and functions that need to be checked on the dozer:

Part or Function	What to Check
Gauges and Instruments	Check that all instruments are displaying properly and are not signaling any alarms or warnings.
Safety Devices	Test all lights and other warning devices.
Attachments	Check that attachment are secured and connected to the dozer properly. Check the condition of the attachment. Check that it works properly.
Travel, Turning and Brakes	Test all movements and brakes, including the emergency stopping device.
Ancillary Equipment	Test out all communications devices and any other systems or functions fitted.

Once you have finished your operational checks it is a good idea to check for external signs of oil or fluid leaks. It is common for the start-up process to cause a leak through hoses breaking.

2.1.3.3 Test Dozer Attachments

Once the attachment is fitted, and before starting work, the dozer operator will need to test the attachment to ensure it fits correctly, that it is secure, and that it will function as required.

This is also to ensure the attachment will not break or become unsafe during operation.

The testing procedure for the correct fitting and use of each attachment will be outlined in the operator's manual for the machine or in site procedures, but generally the process includes:

- ◆ Turn the machine on and operate the attachment controls.
- ◆ Ensure that the attachment is lubricated, moves as it should, and has full range of motion (appropriate to the specific attachment).
- ◆ Inspect all coupling points for any wrongly fitted pieces.
- ◆ Check for any loose attachments or items that are not working within the parameters of the equipment.
- ◆ Test each attachment for loose locking pins, bolts that are not fitted correctly or are loose.
- ◆ Ensure any screws are tight enough for the task.



Things to consider when testing an attachment for fit and operation include:

- Site procedures.
- Dozer procedures.
- Safe operating procedures.
- Attachment operation's manual.
- Dozer operator's manual.
- Site plans, i.e. don't do your test in the middle of a process or other activity.

2.1.4 Recording and Reporting Faults

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

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

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

Note: If you find a fault

Do Not Use

Tag It Out

Report it (Get repaired)



2.2 Drive to the Work Area



During civil construction dozer operations you will need to:

- ◆ Assess the materials you are working with.
- ◆ Use the equipment safely within the technical specifications and limits.
- ◆ Continuously monitor and check for hazards.

It is important to coordinate your activities with other workers when you are planning and carrying out the work to make sure everyone knows:

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

All workers on site must understand their own role and the roles of others before starting work. It helps to make sure work is done safely and efficiently.



Workers you may need to coordinate with include:



- ◆ Supervisors and management.
- ◆ Other plant and vehicle operators.
- ◆ Traffic controllers or other workers on the site.
- ◆ Team leaders.
- ◆ Site safety personnel.

Prior to the shifting of any load the dozer must be driven to the work area.

You should ensure that the route and direction of travel is clear and that you travel at a safe speed. Attachments must be raised smoothly, and the blade must be lowered to allow clear vision.

Always check over both shoulders to ensure the direction of travel is clear before reversing. A reverse warning device should indicate to others that you are intending to reverse.



Wherever possible, side hill travel should be avoided, as there is a greater chance of turning the machine over.



If you must drive the dozer down a sloping surface you should drive directly down the slope, not across or diagonally down. This will ensure the dozer is as stable as possible.

On approach to downhill travel you should reduce the speed of the dozer and select an appropriate gear.

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

If you need to cross a ditch you should slow your speed and approach the ditch at an angle.

2.2.1 Assess Materials

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

A civil construction dozer will usually work with the following materials:

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

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

2.2.2 Calculate Safe Working Loads

Assessing and calculating the load size is important each time you perform a task.

This could be as simple as multiplying length x width x height (or depth) in metres to work out the cubic metre quantity of the material or section to be cut. This gives the volume of material to be shifted.

The following 3 aspects will determine how much or how quickly you could move the load with the dozer:

- 1 Weight.**
- 2 Density.**
- 3 Characteristics of the materials.**

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

2.3 Safe Operating Techniques

To overcome some of the hazards associated with dozers it is necessary to conduct appropriate safe operating techniques.

Applying safe techniques across all terrain surfaces (i.e. the area and ground you are working) is essential to the smooth operation of the dozer.

Safe operating techniques could include:

- ◆ Identifying the types of terrain you will be moving through and noting any potential problems or hazard areas.
- ◆ Altering your operating technique based on the prevailing conditions and terrain.
- ◆ Ensuring you are not pushing excessive amounts of materials up a slope.
- ◆ Being aware of your speed when pushing down a slope.
- ◆ Monitoring the gradient of the slope and ensuring you are not at risk of a rollover.
- ◆ Monitoring speeds and staying within the speed limits of the work zone.
- ◆ Keeping machine within tolerances and capacity.
- ◆ Following site procedures for safe operations of dozers.
- ◆ Following movement plans and haul circuits established during site meetings.
- ◆ Knowing your machine and recognise signs of problems, faults or defects.
- ◆ Abiding by communication protocols established for the site. This includes following all directions and using approved communication techniques for the site.



Appropriate safe operating limits and techniques should be outlined in worksite operations manuals and your operator's manual. Speaking with team members or other dozer operators will allow you to exchange tips and techniques for achieving better outcomes in all types of terrain.

2.3.1 Safe Operating Speeds

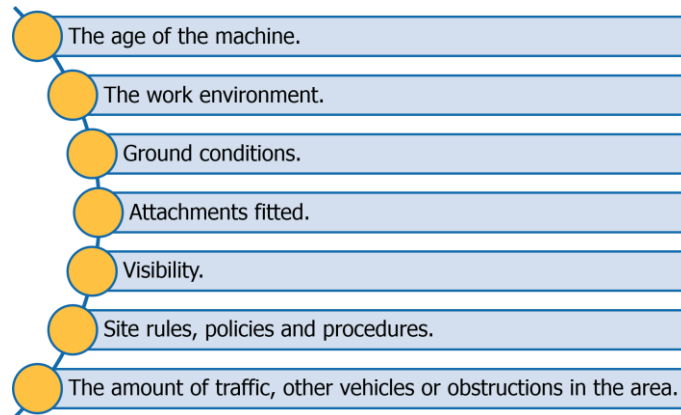
While operating the dozer make sure movements are smooth, not jerky, and that you operate at a safe speed. Operating the dozer too fast can cause instability.



2.3.2 Safe Travel Speeds

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

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



2.4 Apply Appropriate Dozer Operating Techniques



Each worksite has design specifications that need to be met and specified tolerances to be achieved. In order to achieve these tolerances, dozer operators need to be able to identify and apply techniques that help achieve the best possible results, or optimum output, for their tasks on the worksite.

This is a matter of knowing your dozer, knowing the attachments you are using and knowing the terrain you are operating in. Consulting the task specifications and operational procedures is also essential.

If you feel you need to develop better operational techniques or to improve your skills, you can ask a more experienced operator to mentor you.

2.4.1 Dozing Procedures

Dozing procedures will vary depending on the materials to be moved, the conditions and the task requirements.

Some dozing procedures include:

- ◆ Always work at a safe and acceptable speed.
- ◆ Use an appropriate path of travel and ensure direction of travel is clear, especially when reversing.
- ◆ Adjust the speed of the vehicle for the density of the materials and to maintain an even cut or load face. Denser materials such as clay require the dozer to move slower to achieve acceptable results.
- ◆ Assess the density of the material as this affects the pushing capacity of the machine, e.g. clay is harder to excavate and spread than topsoil.
- ◆ Inspect and identify the material types, the haul area or circuit and the grade and terrain of the site before starting.
- ◆ Determine the safe working load by locating the load or data plate attached to the dozer.
- ◆ Scarifying should be used to loosen the surface if needed. The materials should then be dozed and spread.
- ◆ Tyres may slip, be cut or blow out on shale or rock. Take extra care when dozing on these surfaces.
- ◆ Maintain communication with other workers and vehicles on site at all times.



2.4.2 Operate Attachments



Every piece of equipment has design limits and operational recommendations. This applies to both the attachment and the dozer.

Operating within these specifications, recommendations and design limits ensures you do not damage either the dozer or the attachment.

Instructions for using each attachment will be outlined in the operator's manual and shown to you during your equipment induction and familiarisation process.

It is important that you follow and respect the usage recommendations and the design limits for attachments, as this will guide you in using attachments safely and efficiently to achieve the desired results.

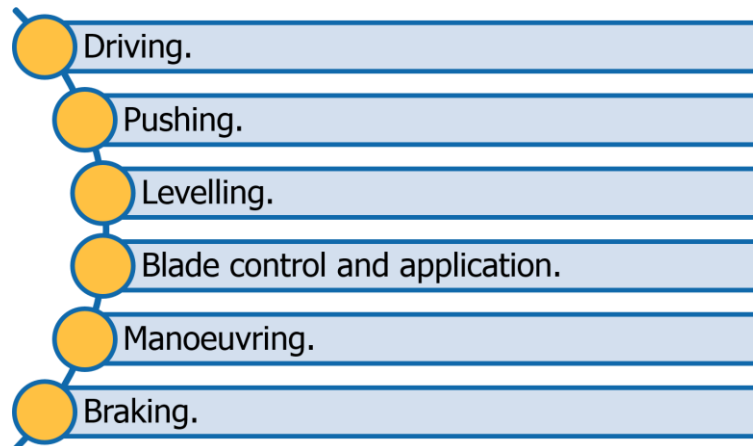
Always remember to first check the load or data plate to determine the safe working load of the attachment and make sure you do not overload it during use.

If you are not able to do so, the attachment should not be used.



2.4.3 Dozing Techniques

Dozing technique include:



2.4.3.1 Driving

When driving the dozer:



- ◆ Always travel directly down a sloping surface using a low gear. Generally the same gear as required to climb the slope.
- ◆ If the tracks are slipping on hard smooth rock, loosen the surface with the ripper and leave a layer of loose material.
- ◆ If you are losing traction on soft muddy material, drop the load being pushed.
- ◆ A full blade of material is easier to control downhill than a part blade. Always attempt to keep your blade full.
- ◆ If your dozer starts to slide sideways on a sloping surface, turn the dozer down the grade and drop the blade.
- ◆ Generally, constant speed is controlled using the governor control lever and the accelerator.
- ◆ When dozing across a sloping surface the front tyres should be leaned towards the uphill side, and the blade should be extended on the down slope side.

2.4.3.2 Pushing

When using the dozer to push:

- ◆ Do not push above the height of the blade as this will affect visibility. It can also form a waterfall of materials behind the blade causing a fouling of the hydraulic arms and therefore affecting control of the load and machine.
- ◆ Do not exceed the capacity of the machine for pushing. If the load is too large or too heavy, you may break cogs or drive wheels. It is even possible to cause a disengagement of the tracks altogether.
- ◆ When pushing objects such as dead trees be careful that the limbs do not break off and fall backwards onto the dozer.
- ◆ Work at a safe and acceptable speed.
- ◆ Ensure that barricades, guardrails or fencing is used to prevent workers from falling into trenches or excavations.
- ◆ When clearing trees or demolition ensure your dozer has an overhead protective structure.



2.4.3.3 Levelling

Levelling techniques are those actions taken to smooth or even out materials on the worksite. Levelling is achieved by moving the blade to a pre-determined degree and level.

When levelling, you need to work to the designated grade, slope or fall (for water to run off).



Some general guidelines for levelling with the dozer:

- ◆ Make sure you know the requirements including dimensions that need to be achieved.
- ◆ Be aware of the type of materials being moved.
- ◆ Ensure the blade is set to the correct depth and angle.
- ◆ Keep blade movement to a pre-determined degree and level.
- ◆ Maintain an accurate speed.
- ◆ GPS and laser levelling equipment has made the process of levelling much easier and more accurate, particularly when the levelling equipment is attached to the blade of the dozer and controls the blade.
- ◆ Be aware of the dozer's pushing capacity.
- ◆ Practice and mentoring is recommended.

Before you start any levelling make sure the attachments are calibrated properly and you have set them to the correct depths and levels for the job.

2.4.3.4 Blade Control and Application

Blade operating techniques should be used to complete your tasks safely and within the equipment limitations.

Common blade operating techniques include:

- ◆ Ensuring that materials being pushed do not exceed the height of the blade as this can cause instability as well as possible damage to the hydraulic arms of the dozer.
- ◆ Using the correct blade for the task, e.g. a coal blade would be used for dozing coal; a tree pusher would be used to push over trees.
- ◆ Using the best blade position for the task, for example:
 - ◇ For spreading soil the blade is tilted forward and at an angle.
 - ◇ For cutting hardpan clay and normal grading the blade is set back at the top and at an angle.
 - ◇ For scarifying on a sloping surface the blade is on the downhill side, crossways and low.
- ◆ Making sure you do not exceed the pushing capacity of your dozer.
- ◆ Manoeuvring the blade effectively by determining the location of blade operating levers within the cabin (generally to the right of the driver) and the correct engagement procedure for the dozer you are operating.
- ◆ Using the blade at the correct height, depth, level and angle.
- ◆ Pushing the blade full of material or with sufficient material to level the surface.
- ◆ Tilting the blade to finish the surface with the required camber.
- ◆ Avoiding obstructions which are outside the path of the wheels or tracks by using the side shift.
- ◆ In an emergency the blade may be dropped as a secondary braking system, but be aware this can cause damage to the blade.



2.4.3.5 Manoeuvring



Dozers are highly manoeuvrable machines, particularly the tracked variety.

Each track is controlled by a separate lever in the cab, making it possible to turn the dozer in very small spaces.

You need to become familiar with the turning capabilities of the machine you are using and the correct gearing for movement.

Refer to your operator's manual to determine which lever is appropriate.

Ensure that you allow enough space for braking, stopping and turning, and that you take into consideration the articulation points and blade settings of the dozer.

Manoeuvring skills often come with experience using the dozer, but you can also read the operator's manual and talk to other experienced dozer operators.



2.4.3.6 Braking

Learning the braking capacity and distance of the dozer you are operating will often come with experience. As they are large machines their momentum will not allow them to stop quickly.



Other braking techniques include:

- ◆ Don't brake too suddenly unless in the case of an emergency or accident.
- ◆ Allow enough distance to stop and apply the brakes in a manner that doesn't put the machine off balance.
- ◆ Monitor braking while turning, especially if locking brakes are fitted.

Operational techniques are best learnt through experience driving the dozer. Gain as much experience as you can, read the operator's manual and speak to experienced operators or your trainer if you would like further assistance or training.

2.4.4 Dozer Operations and Tasks

Common dozer tasks on civil construction worksites include:

Common Dozer Tasks	
◆ Cut and fill.	◆ Cutting drains.
◆ Battering.	◆ Bulk excavation.
◆ Benching and backfilling.	◆ Stripping/spreading topsoil and materials.
◆ Stockpiling.	
Other Dozer Tasks	
◆ Land clearing.	◆ Working in tandem.
◆ Track rolling.	◆ Winching.
◆ Ripping.	◆ Boxing.
◆ Push loading scrapers.	◆ Mixing materials.
◆ Towing equipment.	◆ Constructing fire breaks.

2.4.4.1 Cutting and Filling

Cutting involves removing materials to a predetermined level while filling is moving materials into an area to a predetermined level.

The dozer may be used to push a scraper if it is having difficulty cutting and loading the materials.

Cut and fill is one area where practice and mentoring is recommended. It is important to remember:

- ◆ When cleaning or cutting a ditch the dozer will need to be driven to compensate for slope. The blade should be extended at the correct pitch to clean or cut the ditch.
- ◆ Avoid driving near the edge of a fill as it may collapse.
- ◆ Note: You cannot adequately compact earthworks using the tracks of a dozer



2.4.4.2 Battering

A batter is where the wall of an excavation is sloped back to a predetermined angle. Similar to benching, it is carried out to minimise the risk of the soil or rock slipping onto the excavation.

Battering back (or stepping) an excavation, significantly reduces the likelihood of an accident as long as:

- ◆ It commences from the bottom of the excavation.
- ◆ An angle of repose of 45 degrees is not exceeded unless otherwise stipulated. (All soils have a safe angle of repose, or natural holding position, and under normal conditions should be self-supporting).



2.4.4.3 Benching and Backfilling



Benching involves forming a series of vertical and horizontal planes, which in turn form a number of steps in the wall of an excavation.

- ◆ It is used to minimise the risk of the soil or rock slipping onto the excavation.
- ◆ It is also used in unstable cut and fill slopes, large stockpiles or existing unstable slopes.
- ◆ It is not appropriate for sandy or rocky soil.

Backfill is material that is removed from a site as part of the construction process. Rather than simply being carted away and discarded, backfill is often utilised for some purpose that is not only practical, but also environmentally friendly.

- ◆ Used for landscaping or filling in voids that would weaken underground structures.
- ◆ Excavated material can also be firmly packed around the perimeter of a foundation, to protect the base of the wall.
- ◆ Helps to minimise shifting and thus provide a more stable environment for the structure that is erected on the foundation.



2.4.4.4 Stockpiling

Stockpiling involves the creation of 'hills' or piles of materials for use on the worksite.



When building and maintaining stockpiles the dozer operator is required to:

- ◆ Identify whether it is a storage, holding or live stockpile (i.e. one that is currently being worked).
- ◆ Design the stockpile. Most have a designated size and diameter and it is your task to stay within these dimensions.
- ◆ Be aware of the edges of the stockpile and that as the stockpile gets taller, the overhead lines and structures get closer.
- ◆ Be aware of other workers who may wander into your work zone, and of other machines that may be delivering materials to the stockpile.

2.4.4.5 Cutting Drains

Drainage construction creates methods of clearing surface water from the site into a designated catchment zone. This zone could be a catchment basin, dam, drain lines, or other approved system.

Drainage systems should follow the natural slope of the ground where possible. Look for the water's flow pattern and for signs of natural drainage areas like gullies, creeks and flow lines. This will give you information regarding the lay of the land and the areas that will need to be protected from the runoff from the site.

Runoff is considered to be contaminated or dirty water and needs to be diverted away from clean water areas such as creeks and rivers.



General construction techniques for creating drains:

- ◆ When creating diversion drains or contour drains the gradient of the area should encourage runoff without causing erosion. This runoff will move into the diversion drain or line.
- ◆ Where you need the runoff to change direction you will need to create an area where two or more diversion drains can join. This area is sometimes called a cut out drain. The runoff can then be channelled into the appropriate drainage system.
- ◆ Follow your site environmental and construction plans.
- ◆ Apply logic in the direction of drain creation. If you have any suggestions regarding drain direction talk to your supervisor.
- ◆ Never attempt drainage work when water is pooling on the ground.

2.4.4.6 Ripping

Ripping is used to loosen hard rock or materials. Effective ripping techniques include:

- ◆ Being aware that ripping beyond the capacity of the machine could tear the ripping frame free from the dozer.
- ◆ Monitoring the ground for potential rip hazards such as large rocks.
- ◆ Lowering the rippers while moving and using sufficient speed.
- ◆ Ripping straight, with the grain and down slope.
- ◆ Retracting the rippers at the end of the run.
- ◆ Do not turn while the ripper is penetrated.
- ◆ When losing traction loosen the surface and leave a layer of loose material on the surface.



2.4.4.7 Stripping and Spreading of Materials

Dozers can be used to strip back the top layer of earth to excavate or level an area. The blade is used to cut and lift a small amount of the topsoil.



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

Spreading is the consistent dumping of materials in order to achieve a desired material layer depth or height.

To achieve this, the blade must be positioned to discharge evenly, and travel speed must be consistent. Too fast and the layer will be too thin, too slow and the layer will be too thick.

When spreading materials a dozer could be working in conjunction with other plant items such as scrapers and graders.

2.4.4.8 Bulk Excavation

When using the dozer for excavation work make sure you work safely and follow the work plan including:

- ◆ Checking for underground services (power, telephone, gas, water, sewer, drainage and fibre optic cable lines) before starting to excavate. Talk to the site supervisor who will contact the supply authorities for council maps of the site.
- ◆ Using barricades, guard rails or fencing and warning signs to prevent workers or vehicles and machines getting too close. No workers should be standing within operating radius of the dozer while you work.



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

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

Don't undercut a bank or stockpile as it could collapse and the dozer could overturn.



Do Not undercut banks

2.4.4.9 Site Clean-Up

Dozers are useful for cleaning up worksites after major works have been completed, or preparing sites for other work.

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



2.5 Monitoring Systems and Alarms

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

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

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



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



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

Generally alarms and warnings fit into 3 categories:

Warning Type	Category	Examples	What You Should do
Category 1	These warnings let you know that the machine needs some attention, but it is still safe to operate.	◆ Low fuel. ◆ Low system voltage.	Keep operating as long as it is safe to, and report the problem once you stop work.
Category 2	These warnings indicate that there is a problem caused by the way you are operating that may lead to problems with the equipment.	◆ Equipment is overheating. ◆ Equipment is overloaded.	Change the way you are operating and if the problem is not fixed, stop operating and report the issue.
Category 3	This is the most serious warning level. Continuing to operate while this warning is sounding will cause damage to the machine.	◆ The park brake is on. ◆ Low engine oil pressure.	Stop operating and shut down the equipment immediately. Report the problem straight away.

2.6 Adjust Techniques to Meet Changing Conditions

While you are working, the site will change.



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

Weather Conditions – Rain, sleet, snow, wind and humidity can all affect both your dozer and the materials you are working with. Additional moisture from any source will change the composition of the materials, possibly making them heavier and slippery. This means you will not be able to level or compact as much and you will need to adjust the quantities you are dealing with in each run.

Changing Work Conditions – As more materials are moved around or removed from a site the work conditions may change. Materials that you are working with can change throughout a project. As you compact more or move onto other stages of the civil construction project preparing the road base you will be working with different materials, attachments and personnel.



2.6.1 Monitor and Check for Hazards

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

Check the following things while you work:



Other Machines – At all times you need to know when other machines are working near the dozer. Know and stick to your agreed speeds, travel paths or roads. Good communication between operators is essential to avoid collisions.

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

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



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

Fatigue can be caused by:



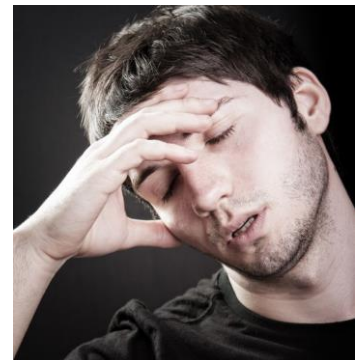
Warning signs that you are suffering fatigue include:

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

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

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

Talk to your boss or supervisor about breaking up boring or monotonous tasks or rotating the work you are doing with other workers if possible.



2.6.2 Reporting Hazards

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

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

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



2.7 Checking Completed Work

The key to completing tasks efficiently is good time management and knowing how to use your equipment properly.



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

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

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

3.1 Park and Shut Down the Dozer

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



3.1.1 Park the Dozer

Dozers that are being moved into an area for maintenance needs to be parked in a safe and efficient manner that will allow easy access to the vehicle.

One way of doing this is to ensure you park your dozer clear of other equipment hazards and following your worksite park-up procedures.

Safe parking practices include:

- ◆ Stopping the dozer on flat level surface in the designated area and keeping the access points clear.
- ◆ If the dozer must be parked on a sloping surface it should be facing across the slope.
- ◆ Ensuring the dozer is parked away from dangerous areas such as access ways, near overhangs, refuelling sites, tidal or flood areas, or adjacent to an excavation.
- ◆ Locks and brakes are applied.
- ◆ Engaging neutral gear (if applicable).
- ◆ Attachments are moved into the shutdown position. This could include lowering the blade and removing pressure from hydraulic lines.
- ◆ All vehicles are left or secured in the way outlined in the site procedures. This could include moving the vehicle to a security area.

If the dozer must be parked on, or protrudes onto an access way, you must ensure that any appropriate barricades, lights or signs are used.



3.1.2 Shut Down the Dozer

Shut down procedures are those tasks and checks done after operations. These commonly include:



- ◆ Cooling of the engine before shutting it down. Dependent upon the vehicle but commonly the same amount of time as the engine warm up time.
- ◆ Monitoring controlled lowering of temperatures and pressures.
- ◆ Walking around the machine looking for any signs of damage or faults that may have occurred during the task.
- ◆ Securing the vehicle, using any applicable lock out or isolation devices and removing the keys. This will prevent any unauthorised movement of the dozer.
- ◆ Ensuring equipment is correctly stowed in accordance with site and manufacturer's requirements.

Any problems found during the shut down procedures need to be documented in the way required by the worksite.

If you are unsure of how the worksite requires you to report problems, or shut down an item of machinery, speak with your supervisor, check your induction information or speak with a co-worker.

3.2 Post-Operational Checks

Post-operational checks need to be done to make sure the dozer is ready for the next operator.

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

As part of your job as a dozer operator, you need to inspect your machine to find and report any faults or damage that may have occurred during your work activities.



Your inspection should include:

Visual Inspection of the Machine	Physically looking for anything wrong, odd, broken or damaged.
Visual Inspection of the Environment	Does the environment around the machine indicate a fault? For example, is there fluid on the ground beneath the machine indicating a leak?
Signals	Alarms, lights and electronic indicators showing that something may be wrong.
Gauges	Showing temperatures and the levels of fuel, oil and other fluids.

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

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



3.2.1 Reporting Faults



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

Most sites have a fault report form that you will need to fill out with the details. The form will generally need the machinery or equipment make and model numbers, the site identification numbers, the type of fault and the person reporting the fault.

You also need to make sure the dozer is tagged out (isolated from use) until the repairs have been made. This will stop anybody from using it before it has been repaired.

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

Note: If you find a fault

Do Not Use

Tag It Out

Report it (Get repaired)

3.3 Prepare the Dozer for Relocation

Before a dozer can be moved from one site to another, it will need to be prepared for transport on a float.



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

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

On most worksites it is necessary to:

Clean the Machine Thoroughly	Most sites will not allow a dirty machine onto the site because of cross-contamination of weed seeds, dirt particles, bacteria, fuels, or oils.
Empty the Fuel Tank	Fuel should be emptied from the machine as a safety issue if required or if specified in site procedures.
Remove Attachments	Attachments may need to be removed from the dozer. Attachments need to be stowed appropriately for transporting with the dozer.
Lock and Lower the Blade	Some blades may need to be removed, particularly on very large dozers.
Secure any Moving Parts	Security pins, locking pins and plates should be applied where appropriate. These pins are designed to keep movable parts from moving.

3.3.1 Move the Dozer between Worksites

Moving larger plant and equipment between worksites is normally done on a float (trailer) because the machines are too slow, or not allowed to drive on the road.

Make sure that an approved traffic management plan is in place before moving between worksites. This may include:

- ◆ Stopping other traffic to allow the equipment to move freely.
- ◆ Using escort vehicles where needed.
- ◆ Sometimes a haul vehicle crossing will be established to allow materials movement across public roadways. Always follow designated traffic control and maintain communication with other workers involved.



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

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

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

3.4 Clean the Dozer and Carry Out Routine Maintenance

Before starting any maintenance on the dozer you need to clean it and make sure you have all of the tools and equipment you need.

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

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

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



3.4.1 Carry Out Maintenance Tasks



Maintenance activities could include:

- ◆ Cleaning the dozer.
- ◆ Authorised servicing and minor replacements or repairs.
- ◆ Refuelling.
- ◆ Recording and reporting of faults through workplace procedures.

Note: You should only carry out maintenance that you are approved to do by the company

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

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

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

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



3.4.1.1 Vehicle Refuelling Procedures

All refuelling of equipment needs to be done in line with safety procedures and workplace instructions.

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

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

Refuelling can be a dangerous activity, so it is important that you know and understand the correct procedures and techniques. If you are not sure what to do, speak with your supervisor.

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



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

3.4.2 Processing Maintenance Records

Most sites have workplace forms, logbooks or checklists for writing down details of all machine maintenance work.

They are used to record the history of the machinery and equipment so that all operations and any problems can be monitored.

They are also a way of making sure that all repairs and maintenance are done correctly and on time.



Written maintenance records for your dozer may include:

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

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

Follow your site record keeping and reporting procedures. If in doubt about completing and processing written maintenance records, talk to your supervisor or an experienced worker.



3.5 Clean Up After Operations

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



3.5.1 Clearing the Work Area



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

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



Good housekeeping will help you to see any problems or hazards on the worksite. This will help you to make sure the working environment is safe.

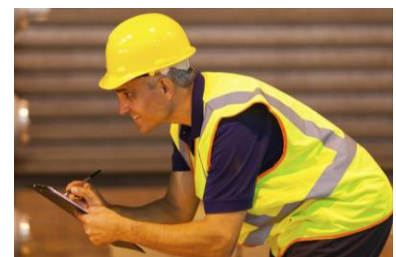
It is your responsibility to clean up after your work activities and not leave it to someone else to do.

3.5.2 Cleaning and Storing Attachments

Once an attachment has been removed it should be cleaned, inspected for wear or damage and maintained according to the manufacturer's instructions and site requirements.

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

Be careful when you are cleaning and maintaining attachments. They may be sharp or hot so make sure you are wearing PPE whenever handling them.



3.6 Process Written Records

Site record keeping procedures keep the site running smoothly.

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

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



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

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

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

