31913: Operate a basic tractor on flat terrain under close supervision

Level 2

Learner Guide

PrimaryITO
KNOWLEDGE TO GROW

Unit standard 31913 v1	Level 2	Credits 3
Operate a basic tractor on flat terrain under close supervision		

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Contents

Introduction

Learning outcome

This unit standard is for people working, or intending to work, in the primary sector.

People credited with this unit standard are able to:

- check a basic tractor before use
- drive a basic tractor over flat terrain.

Before undertaking this Learner Guide it is recommended that you have completed the Learner Guide for Unit 19044, Demonstrate knowledge of the legal requirements and hazards associated with tractor use.

Important information you need to know

You are also expected to know about the following legislation:

- Health and Safety at Work Act 2015
- Land Transport (Driver Licensing) Rule 1999
- Land Transport (Road User) Rule 2004.

You also need to follow all workplace procedures.

This Learner Guide is for people using tractors that are over 1000 kg. It also serves as a prerequisite for unit standards:

- 24539, Maintain and use a power take off (PTO) driven implement attached to a tractor under limited supervision.
- 24538, Demonstrate knowledge of tractor stability and the dynamics of tractors and attached implements.

Glossary

You may find new words (highlighted in **bold black**) as you read through this Learner Guide. The meanings of these words are in the glossary at the back.

Symbols

You'll also see symbols which we've used to help you know what's going on, for example:

Alert: you must be aware of this.

Activity: a written activity for you to do.

Top tip: key information and useful tips.

Attachment: Attach required items here.

Assessment

You will find a separate Assessment booklet for this unit standard. You will need to work through the activities in the Assessment.

Your Verifier will fill in the Verifier declaration once they are satisfied you have achieved the learning outcomes for the unit standard. Your Verifier may be your Supervisor or Workplace Trainer.

The Assessor will check all declarations and fill in the final sign-off once final competency is achieved. The Assessor may be your Training Adviser or a Workplace Assessor.

Introduction

Tractors are very common vehicles used in New Zealand's primary sectors such as horticulture and agriculture.They are used for a range of tasks, such as pulling trailers, large implements and providing energy for machinery via their PTO (power take off) and hydraulic connections. They have a large amount of pulling power at slow speeds.

You may be using a number of cultivation implements. The types of cultivation implements you use will reflect the crop and the area being cultivated. You will also take into account any environmental factors such as weather, soil types, terrain, entry and exit sites.

While tractors are designed for the driver only, sometimes a second seat is provided primarily for a trainer to accompany a trainee driver.

Before driving – perform a maintenance check

Safety is important when driving a tractor.

When using a tractor, you may find yourself working in a remote area, away from others. If the tractor were to break down, you could be stranded for some time. To keep yourself safe, it is important to make sure the tractor has been maintained and is safe to use before you go out. This means you should carry out a maintenance check to make sure the important **components** are in good working order.

When checking your tractor, make sure it is parked on flat ground.

The components to check

There are a range of different components that need to be checked before you start the tractor. The best source of information is the tractor manual that is supplied with every new tractor.

You will check:

Cooling system	When checking the cooling system before you start the engine, look for: • leaks around the radiators and radiator hoses • clogging up of dust or debris around the radiators • wear or damage to the fan or fan belt • puddles of coolant under the tractor. The coolant level needs to be between the marked points on the coolant tank.

Engine oil	• Use a dipstick to check the oil level and if required, top up with suitable engine oil. • Make sure you are parked on a flat surface. • Check the oil before you start the engine, or when the engine has been stopped for at least 5 minutes.
Transmission/ hydraulic oil	• Check the fluid level is within the manufacturer's recommendations. If not, top up. • Only use suitable transmission/hydraulic oil. • Check under the tractor for any leaks.
Fuel	• Turn on the key to check the fuel. • Add clean fuel if the tank is below a quarter full.
Greasing points	• Check they are clean, operable and lubricated. • Steering and front pivot points are very important. • Greasing schedule approximate to every time the tractor empties its fuel tank.
Wheels/tyres	• Check they are properly inflated. • Check the operator's manual for air pressures in the front and rear tyres. • Check tyres for cuts or breaks in the tread or sidewalls. • Look at all wheel nuts and see if they appear tight. • For tyres that have water as ballast (weight) make sure the air valve is at the top of the wheel before checking.
Brakes/clutch	• Check brake and clutch pedals to make sure they are working freely and smoothly and aren't stiff. • Brakes should stop tractor easily without noise. • Clutch should not slip and have required free play. • Check locking devices on the brakes (if there are any) to make sure they are functioning. • Make sure there is nothing underneath the brake or nothing in the cab that can move or roll under the brake and stop it from working when needed.

Lights, windscreen, and mirrors	• Check all are clean and operational.
Battery	• Battery is securely held down. • Connections are clean and there's no sign of corrosion. • The electrolyte level is satisfactory.
Loose attachments and components	• Do a visual inspection. • Look around and underneath the tractor for any parts that may have fallen off or come loose. • Check the ground underneath the tractor for any leaks.
Bird nests	• Check for any birds' nests around the engine.
Air filter	• Check for clogged filter or filter indicator lamp if one is fitted ◦ If you can see the red signal, clean immediately. • Check the air filter is properly in place.
PTO guard	• Check the guards are in place, functional and undamaged. • Check attachments ◦ No loose, missing or broken pins, bolts or lynch pins.
Hydraulic hoses	• Check there are no breaks or kinks in the hoses. • Check all hoses are properly attached.

The windows, lights, windscreen, and mirrors of the tractor cab should be cleaned each day so you can see properly when driving. Lights should be checked for function.

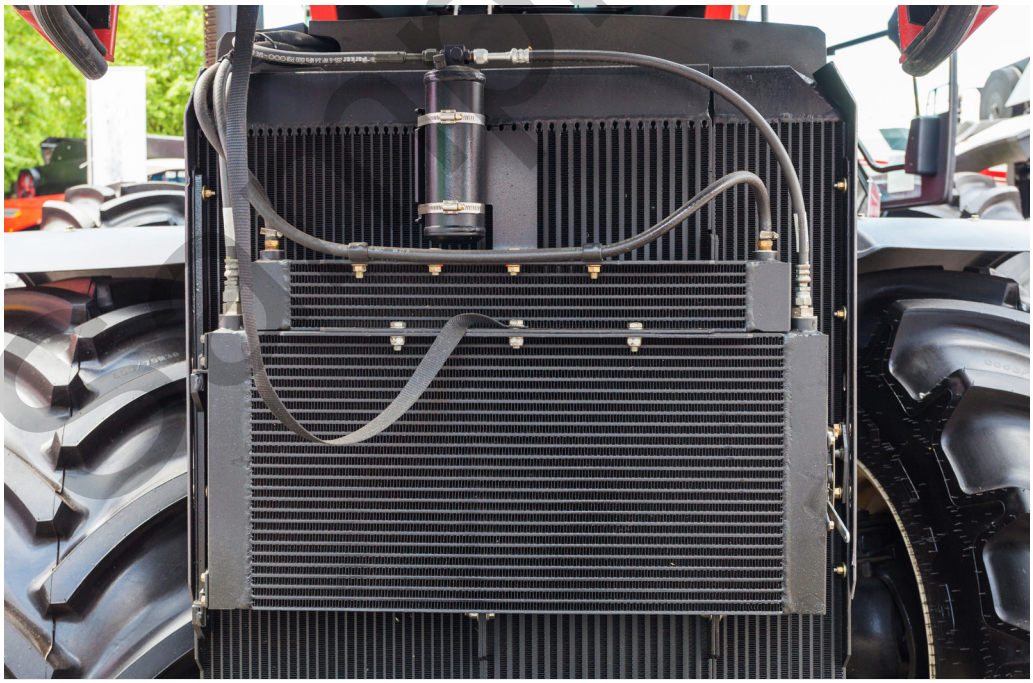
Radiators

It is also worthwhile checking the radiators. Check the amount of coolant and that the coolant looks normal. A change in appearance may indicate a problem. Oily coolant means oil is leaking into the cooling system. If you see this, make a note and report it.

It is common for modern tractors to have several radiators (these can be for engine coolant, transmission oil cooling, intake air cooling and the air conditioning radiator) and these can be placed one behind the other. Seed and dust tends to clog radiators and it is even more of a problem when up to 4 radiators are behind each other with only a small gap in between.

Top up the radiator with clean coolant to within the Hi and Lo marks on the transparent coolant bottle, or if no such bottle, 40 mm of the radiator top.

Loss of water means there is a leak somewhere. You should try to find the cause. If the radiator hose is cracked or worn out, replace it. If the problem is a leaking core or tank, note and report it.



The gaps between closely mounted radiators can clog with seed and dust.

If your tractor is less than 10 years old it will most likely have warning lights on the dash to show when things need attention.

Reporting on any damage or faults found

Your workplace will have procedures that you need to follow if there are any faults found with the tractor. Make sure you know who to report the fault to, and what to do. There will be documentation to fill out, to show what needs repairing or replacing, a record of when it was carried out, and who carried out the work.

Fixing faults within your scope

Once you have reported and recorded the fault, if you are trained in how to fix the fault, then you can follow your workplace procedures for completing the work. You must make sure all paperwork is completed before starting any task, and that you are only doing work for which you have been fully trained.

Remember that any reporting and/or fixing of faults must follow all your workplace procedures.

Tractor maintenance checklist

Your tractor will have been supplied with a manual and maintenance schedule when bought new from the dealer. Use these documents.

In absence of the tractor specific manual, Worksafe New Zealand has a tractor maintenance checklist.

Download this checklist by entering ‘Tractor maintenance record template Worksafe NZ’ into Google and clicking on the link.

Using this workplace tractor maintenance checklist, keep a record of **ten** checks you carry out on the tractor(s) you drive.

Remember to attach a copy of each maintenance record here.

Maintenance record

Date 1		Tractor	
Summary of what actions you took to maintain the tractor			
Date 2		**Tractor**	
Summary of what actions you took to maintain the tractor			
Date 3		**Tractor**	
Summary of what actions you took to maintain the tractor			
Date 4		**Tractor**	
Summary of what actions you took to maintain the tractor			

Date 5		Tractor	
Summary of what actions you took to maintain the tractor			

Date 6		Tractor	
Summary of what actions you took to maintain the tractor			

Date 7		Tractor	
Summary of what actions you took to maintain the tractor			

Date 8		Tractor	
Summary of what actions you took to maintain the tractor			

Date 9		Tractor	
Summary of what actions you took to maintain the tractor			
Date 10		**Tractor**	
Summary of what actions you took to maintain the tractor			

Knowing your tractor

Knowing your tractor is important if you are going to drive safely and competently.

The controls of a tractor are placed at the hands and feet of the driver. The steering is done with the steering wheel and this controls the front wheel direction.

There are usually two throttle controls (a foot pedal and a hand control) and two brake pedals which can be used independently to help make tight turns.

Modern tractors also have a colour coding system to identify the levers:

Orange	Movement (gears, brakes, 2WD, 4WD, accelerator)
Yellow	Power take-off (PTO)
Black	Hydraulic controls

You may want to colour code the controls if they have not already been done.

Your tractor

Identify the following details about your tractor:

Tractor make	
Model	
Horsepower/kw	
Type of transmission (tick)	☐ Manual ☐ Powershift (shuttle) ☐ CVT

Manual transmission

- Manual transmissions are common in smaller or older tractors.
- They use a set number of gears (often around 4), combined with several different ranges, secondary gears (often 2 or 3).
- Reverse is either a range or a gear. Assuming the tractor has 4 gears and a reverse gear, with 3 ranges, there are 12 forward gears and 3 reverse gears.

CVT

- Large tractors use a transmission called CVT (continuously variable transmission).
- CVT doesn't have a set number of gears, but changes the drive ratio between an infinite number of possible ratios.

Powershift

- A powershift effectively uses friction plates to transfer the engine's power to the tractor's drive axles.
- Lets you shift through a large number of gears without the need to operate the clutch.
- To move between gears, hydraulic pressure is applied via an electronic or mechanical valve to engage the right clutch for the relevant gear situated on a main rotating shaft.

Tractor controls and their function

Every tractor will have the following controls which you need to locate and use on the tractor you drive. Remember, every control has a purpose and should be used at the right time.

Tractor control	**Start and stop controls**
Function	Starts and stops the tractor
When might this control be applied?	
• Use when you need to start or stop the tractor. • Only use these controls when you are seated in/on the tractor.	

Tractor control	**Gears or equivalent**
Function	• Slow down to change direction or turn • Increase speed or power
When might this control be applied?	
• When pulling a large set of implements, use the lower gears. • Moving from one field to another with implements raised, use a medium gear. • Moving with no implements attached, or light ones, use road (high) gear.	

Tractor control	**Brakes/hand brake**
Function	Slow the vehicle down by applying friction to the wheels or to aid steering.
When might this control be applied?	
• When you want to slow down. • When you need to aid the steering of the tractor by using individual rear wheel brakes. • Always apply the handbrake when parking.	

Tractor control	**Power take-off (PTO)**
Function	Transfers the tractor engine's mechanical power to another piece of equipment.
When might this control be applied?	
• When using attached implements that do not have their own engine or motor.	

Tractor control	**Hydraulic/3 point linkage levers**
Function	The tractor hydraulic system uses very high pressure oil to perform work on and off the tractor.
When might this control be applied?	

• The tractor hydraulic system uses moderate to high pressure oil to perform work on the tractor, such as:
  ◦ braking
  ◦ steering.
• The tractor hydraulic system uses very high pressure oil to perform work off the tractor, such as:
  ◦ powering implements
  ◦ raising and lowering implements.	

Tractor control	Steering adjustment
Function	To adjust the height of the steering wheel.
When might this control be applied?	
• For greater control and accuracy with the steering. • Driver comfort.	

Tractor control	Differential lock
Function	The differential lock locks the differential gears so that both wheels are forced to turn at the same speed for better **traction**.
When might this control be applied?	
• Driving in wet conditions. • Driving uphill or downhill. • Towing a heavy implement.	

Tractor control	Accelerator and hand throttle
Function	Increases the flow of fuel to the engine which helps increase the power and speed of the tractor.
When might this control be applied?	
• When you need to drive faster. • When you need more power. • When you need to set a PTO implement at the required RPM (revolutions per minute). • Hand throttle allows you to adjust the engine speed by hand when your feet are needed for brake/clutch and other foot controls.	

Tractor control	2WD/4WD
Function	2WD means only the rear wheels are providing the driving force. 4WD means all four wheels are driving at the same time.
When might this control be applied?	
• A 4WD tractor is better suited to conditions where there is less traction (grip), such as muddy, slippery or icy terrain.	

Tractor control	Panel display
Function	To give the driver information about the performance of the engine and the tractor.
When might this control be applied?	
• To help you make good decisions when driving based on the information the instruments in the panel are giving you.	

Tractor control	Front-end loader (FEL) controls
Function	To raise and lower front-end loader attachments, such as buckets.
When might this control be applied?	
• To fill, empty or use front-end loader attachments, such as buckets.	

Tractor control	Beacon
Function	To make the tractor more visible when operated on the road.
When might this control be applied?	
• When driven on the road, a tractor must have a beacon that is visible from the front or rear for up to 100 m. • To improve safety.	

Tractor control	Lights and indicators
Function	Lights allow you to see where you are going and let others see you and understand your intention to turn.
When might this control be applied?	
• When driving in poor **visibility** or darkness both on and off-road. • When turning at intersections or pulling off to the side of the road.	

Tractor control	Seat controls
Function	Allows the seat to be set to accommodate different sizes of operator so they may comfortably reach the controls. Always work the tractor's controls from the driver's seat unless the manufacturer has specifically designed controls for use in other positions. Never start the tractor from the ground.
When might this control be applied?	
• Always set the seat and the steering wheel for your comfort before operating the tractor. • If the manufacturer has designed controls that you can work from the ground, make sure you're standing where you are not in danger of being run over or crushed.	

Older tractors may have different legal requirements for lights and indicators because of their age. If you are driving an older tractor, make sure you know its legal requirements for lights and indicators.

Using the throttle

Most tractors have a foot throttle as well as a hand throttle. Learn how to use both the foot and the hand throttle. The hand throttle should be **predominant** when you are working on a task. The foot throttle may be predominant when in transit mode.

Using a foot throttle is not recommended in rough conditions because your foot bounces up and down and it is hard to keep the engine speed steady.

Using the hand throttle is recommended when needing to keep the PTO at 540/1000 RPM.

Hydraulic controls

Hydraulic controls allow you to control the hydraulic arms at the back of the tractor (or any other implement connected to the hydraulic system of the tractor) by hoses called ‘remote hydraulics’.

These are levers located on the right-hand side of most tractors. Moving the levers **rearward** should always raise the implement. If this is not the case it is probable that hoses have been connected incorrectly.

Draft control is activated either from the top link or lower link sensing.

Control panel instruments

There are different instruments found on the control panels of tractors. If you are not sure what an instrument is for, ask your Supervisor or read about it in the tractor manual.

Important control panel instruments that you need to know about in your tractor include the following.

Tachometer	• The tachometer is the main instrument on the dashboard. • A needle shows the speed of the engine in revolutions per minute, the PTO speed and the total engine hours. • The forward speeds of the tractor in each gear are shown on some tachometers.

Oil pressure gauge	• The oil-pressure gauges/warning lights are important instruments because they show the pressure of the oil in the engine or the transmission.
	• If the pressure drops for any reason you should:
	  ◦ stop the motor immediately and find out the cause
	  ◦ identify whether it's an engine or transmission fault.
	• Instead of a gauge, some tractors have an oil-warning light that comes on when the oil pressure drops below a certain point.

Temperature gauge	• The temperature gauge shows the temperature of the water in the engine. • Any rise in temperature above normal must be investigated immediately, or there could be serious damage.

Ammeter	• The ammeter tells you whether the alternator or generator on your tractor is working properly. The needle should always show a positive charge when the engine is running above idling speed. • Some tractors do not have an ammeter but have a warning light that comes on when the battery is discharging.
Fuel gauge	• Not all tractors have a fuel gauge, but on those that do, it shows the amount of fuel in the tank. • If a fuel gauge is not fitted, you need to check the level of the tank regularly, especially if the tractor runs on diesel. • If a diesel tractor runs out of fuel, it needs to have the fuel line/injector system bled (in other words, all the air removed from the system).
PTO	• On some tractors, the PTO is controlled by the master clutch used to stop and start the tractor. • Other tractors have a separate clutch used only to operate the PTO. These independent clutches are usually hand-operated.

Control panel instruments of a modern tractor.

Knowing your tractor

Find each of the following items/components on the tractor you drive.

In your own words, tell your Supervisor:

- what each item/component does
- what it is for
- how it works.

Item/component to locate on the tractor you drive	Can explain what it does, what it is for, and how it works (tick ✓)	
	Yes	No
Tachometer	☐	☐
Oil pressure lights/gauges	☐	☐
Temperature gauge	☐	☐
Ammeter	☐	☐
Fuel gauge	☐	☐
PTO	☐	☐
Start and stop controls	☐	☐
Gears or equivalent	☐	☐
Brakes	☐	☐
Power take-off (PTO)	☐	☐
Hydraulic levers	☐	☐
Differential lock	☐	☐
Accelerator (throttle)	☐	☐
Steering adjustment	☐	☐
2WD/4WD	☐	☐
Panel display	☐	☐

Item/component to locate on the tractor you drive	Can explain what it does, what it is for, and how it works (tick ✓)	
	Yes	No
Loader controls	☐	☐
Beacon	☐	☐
Lights and indicators	☐	☐
Seat controls	☐	☐
3 point linkage controls	☐	☐

Driving over flat terrain

Much of the time you will be driving a tractor will be on flat terrain. Flat terrain is considered land which is:

- flat to gently **undulating**, with a slope between 0–3 degrees
- undulating, with a slope between 4–7 degrees.

Examples of flat terrain are:

- flats
- terraces.

Many tractor roll-overs happen on flat land. Because any tractor accident is serious, with the potential to cause injury, you will be supervised while driving. This means you must have someone either with you when driving or watching you drive. This is for your safety until you become more experienced.

Practice driving the tractor on flat terrain in different conditions and with implements until you have the confidence and have good control.

Just because the terrain is flat, it doesn't mean the tractor will not roll over. Almost half of all tractor roll-overs in New Zealand happen on flat land.

Moving off

Unlike a car, a tractor can start off from a stationary position in quite a high gear.

Slowing and stopping

When slowing down, don't change down a gear as you would with a car. Most tractors are not designed to be driven this way. You are likely to have trouble getting the tractor into the gear you want, and it is very easy to lose control while the tractor is in neutral, especially if you are going downhill.

When driving in top gear, use the braking effect of the engine to slow down. To do this, push the throttle back to idle, and let the tractor slow down before you brake.

It is hard to keep the brakes evenly adjusted, especially when the steering brakes are used often (such as in cultivation work). Even when the brakes are locked together, using them carelessly at speed can result in the tractor suddenly veering to one side or rolling. Push the clutch in just before you stop moving.

It is hard to keep the brakes evenly adjusted when the steering brakes are used often, such as in cultivation work.

Driving with a trailer

When driving a tractor with a trailed implement, don't make sudden changes of direction or speed, otherwise you may lose control of the vehicle or lose your load.

Sharp turns may cause the drawbar of the implement to hit the back wheel of the tractor and ride up the wheel as it rotates. This causes damage to the machinery and perhaps serious injury to you.

Brake slowly or you may cause the tractor to jack-knife.

Reversing a trailed implement needs practice. Before trying this, check the implement is designed to be backed. Some implements need to be taken out of gear or lifted clear off the ground before they can be reversed or they may get damaged.

When reversing, the implement and tractor will pivot at the drawbar, and the implement will travel in the opposite direction to the tractor. Make small corrections in direction and drive slowly to reduce the chances of jack-knifing.

Brake slowly or you may cause the tractor to jack-knife.

Front-end loader use

A front-end loader, especially when it is loaded, can cause a lack of balance of weight distribution. This often leads to instability and rollovers. This is made worse by any sharp turns, high speeds and uneven terrain.
Front-end loaders change the physical and handling characteristics of a tractor. When it is loaded with materials, these characteristics are even more unpredictable.

Factors that give risk to FELs on tractors are:

- As the FEL is raised so does the tractor's centre of gravity. A high centre of gravity (top heavy) results in a vehicle that is easy to topple (roll over).
- The load on the FEL is carried in front of the front axle which takes weight off the rear axle. The rear axle of a tractor is fixed and designed to carry heavy loads and give the tractor stability. The front axle is hinged (it pivots) and is not designed to carry great loads. It is also not designed to give stability but is designed to float over undulations.
- When using a FEL the weight is transferred from the stable rear axle to the hinged (pivoting) front axle. This leads to less overall stability which can lead to rollover.

As the FEL is raised so does the tractor's centre of gravity.

Conditions you could be driving the tractor in

Conditions you will encounter and need to gain experience on include:

Heavy dew

- Heavy dew can make conditions wet and slippery. Drive slowly and carefully, especially when the surface is damp, wet or slippery. The tractor can easily lose traction in wet conditions.

Wet areas

- Wet areas can be slippery and a loss of traction can cause the tractor to veer towards a dangerous area, maybe even leading to a roll over. It can also cause the tractor to become stuck. Drive slowly, avoid any wet areas if possible, and engage the 4WD when driving through wet areas you can't avoid.

Tracks

- Drive on tracks with very slight gradients, that give you firm grip or traction, and are not likely to cause a roll over.
- Do not drive on deeply rutted tracks made by previous users as the tractor can easily hit the edge of a deep rut and lose its stability.
- Cow races (tracks) with dried cow dung that have become wet are very slippery, especially on concrete.

Muddy ground

- On muddy ground you are looking to get as much traction as possible. This usually means you should keep moving. Try not to stop.
- Avoid driving over areas that have already been driven on, as these will get progressively more slippery the more you drive over them.
- Keep your load as light as possible when driving through mud.
- Use 4WD if you have it.
- Find a safer route.

Firm ground

- Drive at a safe speed, watching for any obstacles that you may hit and cause you to overturn.

Loose gravel

- Loose gravel can cause problems with less traction when compared with hard packed surfaces.

Pasture

- Although the pasture may look flat and smooth, it isn't. There will be dips and furrows that you can't see easily.
- Drive slowly and carefully, looking for any features that could cause the tractor to roll over or lose stability. Holes, furrows or rocks can all cause a tractor to roll over.
- Be especially cautious in long grass or vegetation.

Undulating race/terrain

- Undulating terrain always affects stability. For example:
    - Going uphill, the centre of gravity and centre of mass move to the rear adding traction to the rear wheels at the same time lightening the weight on the front.
    - Going side on to a hill, the centre of gravity goes to the down side, which lightens the weight on the high side of the tractor.
- Drive straight down and straight up, not across the slope.

Culvert crossings

- Ensure you aren't going to destroy the embankment, so it needs to be stable and not soft ground over the culvert before you drive across it.
- Ensure the culvert is wide enough for the tractor.

Cultivated land

- You want pulling power when cultivating, so use 4WD if you have it.
- Check the width of any implements that you are pulling or towing to make sure that you are not going to damage any rows or ploughed land.
- Check the turning circle so that you can make any turns in the rows without damaging crops.

You will often find that while driving the tractor the surfaces will change. You will need to understand what happens to the tractor when the surface changes and what you need to do to keep control of the tractor during this time.

Going uphill, the centre of gravity and centre of mass move to the rear adding traction to the rear wheels at the same time lightening the weight on the front.

The tractor pictured above would gain stability by lowering the implement closer to the ground, which would in turn lower the centre of gravity and reduce the risk of rollover. It does not need to be this high.

Scenarios when driving over different changing surface conditions

Read through the following scenarios and answer each question.

What would you do if you are driving a tractor at high speed along a race and a rut or bump in the race causes the wheel to turn suddenly?

The differential (diff) lock can help maintain traction and stop you getting stuck, but it can also cause problems.

- You have had to use the diff lock in a muddy paddock to stop yourself getting stuck. You drive out onto the sealed road and forget it is still on. What problem could this cause?

- You drive through a drain and as you head out, the tractor gets stuck with the front facing upwards at quite an angle. You can't drive out of the drain because the right rear wheel is spinning. You decide to engage the diff lock without disengaging 'drive' to the wheels resulting in sudden diff locking action. You do this to try to regain some traction. What problem could this cause?

Complete the table below with the actions you take when changing the type of surface you are driving on.

Surface change	What actions you take
Pasture to undulating race	
Firm ground across a muddy culvert	
Gravelled road to cultivated land	
Muddy ground to loose gravel	
Heavy dew to dirt track	

What are the legal requirements while driving a tractor?

Legal requirements for wearing seatbelts when driving tractors on:	
Private property	
Public roads	

Legal requirements around wearing/using personal protection equipment (PPE) while driving tractors on:	
Private property	
Public roads	

Legal requirements for the use of a safety frame on tractors using:	
Private property	
Public roads	

Legal requirements for carrying passengers when driving tractors on:	
Private property	
Public roads	

Information must be displayed on the vehicle (vehicle displays) when driving tractors on:	
Private property	
Public roads	

Legal requirements around tractors having warrant of fitness when driving tractors on:	
Private property	
Public roads	

Legal requirements around tractors having a registration when driving tractors on:	
Private property	
Public roads	

Legal requirements around the legal age of being able to drive a tractor on:	
Private property	
Public roads	

Legal requirements around licences needed to be driving tractors on:	
Private property	
Public roads	

Legal requirements when driving a tractor

Test your knowledge. Once you have answered all the questions turn to the back of the Learner Guide to check your answers.

1. What is the minimum legal age to drive a tractor under 6 tonnes (including load)?

In the workplace	
On a public road	

2. What licence (and other conditions) are required to drive a tractor on the public road?

Under 6 tonne	Licence: Other conditions:
Between 6–18 tonne	Licence: Other conditions:

3. A tractor driven on the road is generally a slow vehicle. What must a slow vehicle display?

4. What is the basic requirement for carrying passengers on a tractor?

5. Give an example of when a tractor does not need a safety frame.

6. Give an example of suitable footwear and clothing to wear when driving a tractor.

Footwear	
Clothing	

7. What are **two** reasons it is important to wear earmuffs when driving a tractor?

1.	
2.	

8. Give an example of when earmuffs might not be needed and why.

9. Why should you wear a safety belt when operating a tractor (if one is fitted)?

Tractor log

To complete this workbook and its accompanying assessment you must have evidence of a minimum of **10** hours driving a tractor in a workplace situation, over at least a three-week period, covering a range of tasks. Use the log provided to capture the hours and workplace situation in which the tractor was driven. You will need to get your Supervisor to sign this off for you.

Date	Activity	Terrain/weather	Hours
1/08/20	Feeding out using a hay bail feeder	Flat terrain/ dry weather	30 mins
		Total hours	

Safe driving

When you are in control of a vehicle, you need to follow safe driving practices. Rural environments have different features to city roads. You can expect to drive on hills, gravel/shingle, mud, dirt tracks, over pasture and through water. You can also be driving on these surfaces in all weathers and around livestock. All of these can affect:

- visibility
- stability
- traction
- safety.

To drive safely, you need to use safe driving practices:
• concentration • appropriate speed • driving to the conditions • following workplace policies • reading the situation.

Concentration

Concentration and paying attention while driving is essential. By always keeping your focus on your driving, you give yourself enough time to react to events, such as:

- livestock or fallen vegetation in your way
- changing surfaces, such as bitumen to gravel
- crests which reduce visibility.

If you drive when you are very tired or distracted, you are at greater risk of making mistakes and maybe an accident. Take a break or have a rest if you need to.

Speed

Driving at an appropriate speed saves lives. Speed is not how fast you are going. It is whether you are driving at an appropriate speed for the conditions. Driving at speeds that are too fast or are not appropriate for the conditions:

- give you a false sense of confidence
- reduce your reaction times
- increase your braking distance
- reduce tractor stability
- increase the chance of losing control of the vehicle
- put you at greater risk of an accident if you have to stop suddenly.

Driving to the conditions

Driving to the conditions means driving in a way that is safe given the surface and the weather. For example, reducing your speed:

- in bad weather
- slippery and/or rutted surfaces
- in icy or foggy conditions
- at night or when visibility is reduced, such as fog or heavy rain.

Following workplace policies

Workplaces will have policies on the safe use of vehicles. These policies may have requirements on:

- wearing seatbelts and other safety equipment such as wearing helmets
- being licensed
- following all driving laws when on public roads such as speed limits
- not driving under the influence of alcohol or drugs
- only using the vehicle in appropriate conditions and not taking to unsuitable areas (no go areas)
- only carrying approved loads and passengers
- reporting any accidents or near misses.

Reading the situation

Reading the situation will help you prepare for any tricky situations you may find yourself in. It may also help you avoid trouble in the first place. Reading the situation means:

- thinking ahead
- looking at the terrain and assessing its risk
- anticipating sources of danger
- avoiding tricky situations
- taking preventative/proactive measures.

Illegal drugs and alcohol

Illegal drugs and alcohol affect your ability to make good decisions when driving. They also affect your concentration and reaction times. If you take prescription medications, check there are no side-effects that could put your safety at risk when driving the tractor.

Never drive a tractor while under the influence of illegal drugs and alcohol.

You must always drive the tractor in a controlled manner. This means that you have control of the tractor no matter the conditions. You must be aware at all times of any hazards around you, and be sure to apply any control measures to minimise the risk of damage to the tractor, property, and terrain you are working in.

If you need to get out of the tractor and check the ground conditions or move something out of the way, then do so in a safe manner. Stop the tractor, apply the brakes (power off if necessary) and dismount safely.

Parking the tractor and any implements attached

It is important to always park the tractor safely and in the correct place, such as a shed or building, or in a designated area. Parking safely stops the tractor from moving and causing injury. Parking the tractor in a designated area means people can easily find the tractor and are unlikely to run into it when driving around your workplace in another vehicle.

To park the tractor and any implements safely:

- bring the tractor to a complete stop and park on a level surface
- lower all attached equipment to the ground
- move controls to neutral, lock controls (if so equipped) and set the parking brake
- make sure the PTO (power take off) is disengaged or off
- allow the tractor to idle down before turning off the engine
- remove the key
- wait for all moving parts to stop
- unbuckle your safety belt and exit by backing down the steps with both hands on the grab bars
- block hydraulic equipment, as necessary.

Lower all attached equipment to the ground when parked.

Parking your tractor

Your workplace will have policies and procedures on how and where you can park the tractor that you work on. For the following situations, say where and how you are expected to park the tractor.

1. When opening gates

2. When stopping to carry out operations that see you outside of the tractor.

3. When you have finished the day's operations.

4. When carrying out simple repairs or maintenance during field operations.

5. When the tractor is having implements attached to it.

Refuelling the tractor

Diesel and other fuels are flammable and are always a risk to your safety. Spilt fuel can be harmful to your skin and lungs, and it can also become a fire risk for your workplace.

Follow these steps to safely refuel the tractor.

Drive up to the place where you will refuel very slowly and carefully.	You do not want to accidentally hit or damage any of the equipment associated with refuelling.
Before you refuel your tractor, make sure that it is parked safely, on flat ground, and that the brakes are engaged. Turn off the engine when refuelling.	There must be no chance that the tractor will move or rollover while you are refuelling. Always refuel outside.
Remove the fuel cap slowly.	There may be a buildup of pressure inside the fuel tank that needs a slow release.
Ensure no one is smoking or has a naked light around the vehicle while refuelling. If the fuel tank is located near a part of the tractor that may be hot, such as the muffler, you need to let this cool down before you start to refuel.	To eliminate any risk of fire.
If you are refuelling from a can, fuel tank or mobile tank, ensure the nozzle is always in contact with the fuel tank.	Static electricity can build up, and can ignite. By keeping the nozzle in contact with the tank you reduce the chance of any static electricity building up as it will travel through the nozzle. You may need a grounding wire or to lower any FEL which will also help reduce any static electricity build-up.

Refill the tank slowly.	Try not to spill any fuel, as it can become a hazard if it spills onto the ground. Fuel is flammable and can ignite if it comes into contact with anything hot (including the sun).
Don't overfill your tank.	Fuel will expand when it becomes hot, so you need to leave enough room to cater for this expansion.
Replace the cap carefully, and ensure that it is on correctly.	So no fuel or fumes can escape.
Once you have refuelled, empty the hoses of any fuel, and clean up any spillage that may have occurred.	Minimise any fire risk.
After refuelling, make sure that there is enough ventilation to get rid of any fumes before you start the tractor.	Fumes can make you feel sick or dizzy.

To prevent condensation (water), fill the tractor fuel tank at the end of each day's work when conditions are warm (in preference to the cool mornings when condensation levels are higher) to within 2 cm of the top.

Condensation in the fuel is bad for the engine. When it reaches the cylinders, it makes them misfire and often stops the engine. It can also encourage the growth of a **diesel bug** that will eventually block the filters and injectors.

The equipment used to transfer fuel into the tank should be clean. After filling, make sure the cap is tightly fixed.

Activity answers

Legal requirements when driving a tractor

1. What is the minimum legal age to drive a tractor under 6 tonnes (including load)?

In the workplace	12 years
On a public road	16 years

2. What licence (and other conditions) are required to drive a tractor on the public road?

Under 6 tonne	Licence: Full Class 1 Other conditions: Can exceed 40 km/h on the road
Between 6–18 tonne	Licence: Restricted or Full Class 1 licence Other conditions: Speed can not exceed 40 km/h

3. A tractor driven on the road is generally a slow vehicle. What must a slow vehicle display?

An amber beacon light.

4. What is the basic requirement for carrying passengers on a tractor?

Only carry a passenger if there is an instructor seat, ROPS and a seatbelt.

5. Give an example of when a tractor does not need a safety frame.

Tractors purchased new on, or before 31 August 2001 that are: crawler tractors, and wheeled tractors weighing under 762 kg or more than 4000 kg. Tractors purchased new after 31 August 2001 that are: tractors weighing under 700 kg. Tractors used in the following operations: • operations connected with any orchard, hop garden, blueberry garden or greenhouse • operations in any vineyard carried out beneath vines supported overhead • operations in or adjacent to any building or structure used in the keeping and care of poultry for pecuniary gain.

6. Give an example of suitable footwear and clothing to wear when driving a tractor.

Footwear	Sturdy work boots
Clothing	Overalls – no loose-fitting clothing

7. What are two reasons it is important to wear earmuffs when driving a tractor?

1.	Block out noise from the tractor to minimise fatigue and help maintain concentration for longer.
2.	Protect your hearing.

8. Give an example of when earmuffs might not be needed and why.

When in a sound proof cab with windows closed.

9. Why should you wear a safety belt when operating a tractor (if one is fitted)?

In case the tractor rolls or you hit a bump that throws you up off your seat or you come to a sudden stop. To stop you from being thrown out of the tractor.

Glossary

Term	Definition
Components	A component is a part of an engine or vehicle.
Close supervision	Refers to the operation of a basic tractor under the active supervision of a supervisor who has the knowledge and experience to ensure that the driver is safe at all times.
Diesel bug	A combination of yeasts mould and bacteria that work together contaminating diesel. They thrive on the condensation of water in diesel tanks.
Predominant	The most common or the one mainly used.
Rearward	Towards the back.
Traction	The grip of a tyre on the ground.
Undulating	Land that has gentle curves or slopes.
Visibility	How far you can see given the light and weather conditions.
Workplace procedures	Workplace procedures refer to the verbal or written instructions to staff on policies and procedures for use and safety of vehicles and machinery in the workplace.

Resource Feedback

In order to keep our resources as up-to-date and relevant as possible we would appreciate any comments, feedback or suggestions you may have with regard to this particular resource or others that you have used.

Please contact us via email **product@primaryito.ac.nz** if you have any suggestions that you feel would be useful.

Please remember to indicate the resource you are giving feedback on in your email, and please provide your contact details.

Thank you for taking the time to provide us with feedback.