GOOD PRACTICE GUIDELINES

Safe use of self-propelled agricultural plant

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New Zealand Government

WORKSAFE NEW ZEALAND | MAHI HAUMARU AOTEAROA

The purpose of these guidelines is to help reduce the risk of injuries and fatalities by providing practical guidance on the safe use of self-propelled agricultural equipment, such as combine harvesters.

ACKNOWLEDGEMENTS

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> Accident Compensation Corporation (ACC)
> Beef and Lamb New Zealand
> DairyNZ
> Dairy Women's Network
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> New Zealand Dairy Workers Union
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SELF-PROPELLED PLANT KEY POINTS:

- Keep three points of contact while mounting or dismounting
- Avoid blockages
- Ensure machinery has stopped before attempting to clear blockages by hand
- Ensure guards and shields are in place
- Perform regular maintenance and cleaning

TABLE OF CONTENTS

FIGURES

01/

INTRODUCTION

IN THIS SECTION:

These guidelines provides practical advice about the safe use of self-propelled agricultural equipment, such as combine harvesters.

1.1 PURPOSE

The guide outlines potential hazards and provides recommendations to eliminate, isolate and minimise those hazards. WorkSafe NZ accepts these recommendations as current industry good practice. They will help you comply with the Health and Safety in Employment Act 1992 (the HSE Act).

1.2 SCOPE

This guide applies to farmers, agricultural contractors, horticulturalists, viticulturists and anyone else using self-propelled agricultural plant. Training providers will also find this guide useful.

It focusses on on-farm use of self-propelled agricultural plant. For on-road guidance, see NZTA's Agricultural Vehicles Guide which can be downloaded from: http://www.nzta.govt.nz/resources/agri-vehicles-guide/index.html

1.3 DEVELOPMENT

Industry experts helped WorkSafe NZ develop this guide. WorkSafe NZ also conducted a thorough review of accident statistics and published academic literature, and looked at how overseas health and safety regulators manage the same issues.

WorkSafe NZ has taken every effort to make sure the guide's recommended hazard controls reflect current good practice.

02/

HAZARDS AND CONTROLS

IN THIS SECTION:

The most common hazards faced by users of self-propelled agricultural plant, such as combine harvesters, are set out on the following pages. Guidance is provided about ways to effectively control these hazards.

2.1 MOUNTING AND DISMOUNTING

Often injuries happen when operators dismount agricultural vehicles. These happen when people slip and fall to the ground or jump down and land heavily on uneven ground. If the operator dismounts forwards down the access steps, their pant cuffs or boot loops can snag, tripping them forward off the machine.

On some machines the fuel inlet is located near the access steps into the vehicles cab. If fuel spills onto the steps it can make them slippery, increasing the chances of a fall.

MANAGING THE HAZARD:

When climbing on and off self-propelled agricultural plant, always keep three points of contact (eg two hands and one foot) with the vehicle or ground. Dismount facing towards the vehicle, the same as you do when mounting. Never jump on or off a moving vehicle.

Clean the steps regularly. Take care not to spill fuel on the steps. You are more likely to slip and fall if the vehicle steps are dirty or wet.

Operators should also wear suitable footwear with a good grip, and clothes like overalls that will not snag on machinery.

Before dismounting, always engage neutral, apply the brakes, and disengage any machinery, even just to open a gate. If you're leaving the machine to do something else, shut off the engine.

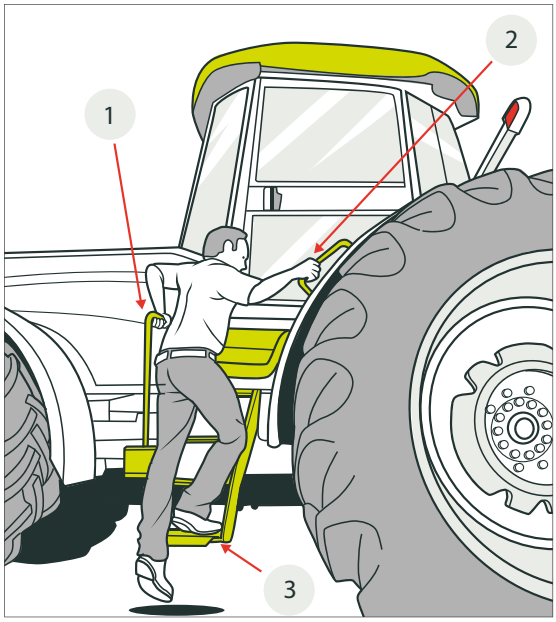

Figure 1: Getting on or off with three points of contact

2.2 FALLING FROM THE MACHINE

Another hazard is falling from the machine, especially during pre/post season cleaning.

MANAGING THE HAZARD:

Always use the access ladders, steps and/or standing platforms provided by the manufacturer.

Assess the mobile plant to ensure that it has no slip, trip or fall hazards, ie make sure it has low steps, secure handgrips, adequate access, sufficient cab space and a safe mounting platform.

> Provide and use suitable access equipment if it is necessary to work at height during cleaning and maintenance operations.

> Use built-in ladders and other purpose-designed access points and platforms where provided. Where such facilities don't exist you will need to consider alternative safe means of access, eg with measures provided to prevent falls.

> Wear slip resistant footwear and avoid wearing loose clothing.

Don't:

> adjust or perform work on implements while they are in motion

> climb on or around areas of the machine unless there is purpose built access available (eg steps, standing area etc)

> carry passengers, unless a passenger seat is provided

> let people jump on or off the harvester when it is moving.

2.3 DEALING WITH BLOCKAGES

Fixing blockages in machinery is potentially very hazardous because it involves dealing with moving parts that can crush, cut, or amputate body parts.

The main blockage hazards with mobile plant are:

> entanglement with augers

> entanglement with belts and conveyors

> cuts from blades, fingers, knives and strippers

> entanglement with pulleys, belts, chains and sprockets

> rotating drums/discs/disc mowers, harvesting heads, processing drums.

MANAGING THE HAZARD:

Avoid blockages if possible.

Use your instruments and watch and listen for potential blockages – avoiding blockages is easier than clearing them.

> Adjust the machine settings to help avoid blockages. Follow the manufacturer's instructions/procedures, eg as set out in the operator's manual.

> Be patient when working in difficult crop conditions such as in laid crops (lodging), unfamiliar crops, or fibrous crops like linseed.

> Don't operate the machine beyond its capacity (ie don't overload it).

Use reversing drive mechanisms, when fitted, to wind out blockages.

If that doesn't work, then you will have to get out and deal with the blockage manually. If so use safe stop procedures:

Stop the machine. Put it in neutral. Disengage any machinery. Turn off the engine and apply the handbrake before exiting the vehicle. Make sure machinery has stopped moving before putting hands in to clear the blockage.

When dealing with blockages:

Follow the procedures set out in the operator's manual.

Secure anything that could fall on you, eg by using props on tailgates/doors.

> Secure anything that could move or rotate, eg by using chocks.

> Remember that energy is stored in springs or hydraulics. Consider how you will stop this energy being released, or release it safely.

> Use the right tools for the job. Remember, machine components may suddenly move when a blockage is cleared.

> Use built-in ladders and other purpose-designed access points and platforms where provided. Where such facilities don't exist, consider alternative safe means of access, eg with measures provided to prevent falls.

> When the job is finished, always replace the guards before running the machine.

> Check the machine over before restarting.

2.4 AUGERS

Unblocking augers has the potential to cause injuries. When an auger wears, the sides sharpen up like a razor. Even when they are not rotating, augers can cause serious cuts.

In combine harvesters, entanglement with the discharge and levelling augers in the grain tank is a significant cause of operator injury. Such injuries result almost entirely from intentional, unsafe entry into the grain tank.

MANAGING THE HAZARD:

If you can, use something other than your hands to clear the blockage.

A "push-stick" can be used to clear blockages rather than using your hands.

Do not enter the grain tank of a combine harvester unless absolutely necessary.

2.5 CONTACT WITH BLADES/ FINGERS/KNIVES/STRIPPERS

Many types of agricultural equipment use cutting edges for various aspects of harvesting or processing. If you come into contact with these sharpened edges during maintenance or when dealing with blockages/jams, it can result in cuts or amputations.

The main risk is during maintenance, especially if maintenance has to be done in the field, ie when a blade or knife hits a stone and bends, and has to be fixed before the operation can continue.

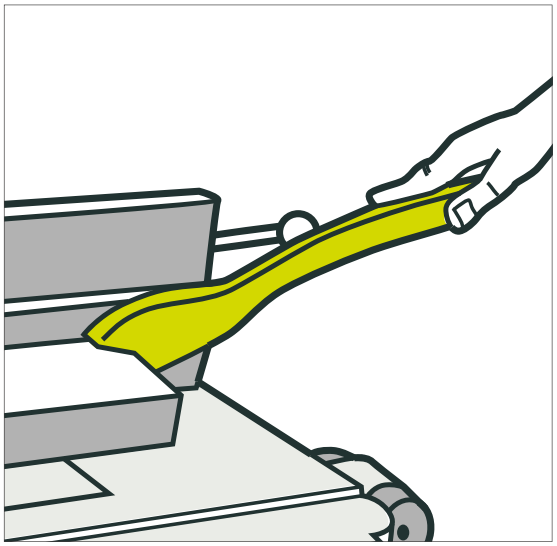

Figure 2: "Push-stick"

MANAGING THE HAZARD:

Follow the procedures in the operator's manual for maintenance, repairs and removing blockages. Use appropriate safety equipment (gloves, eye and hearing protection).

Ensure all guards are in place.

> Make sure you have the right tools for the job. Use the tools you have correctly.

> Use supports when working under raised equipment.

> If there is a major problem, get specialist assistance.

Schedule regular maintenance for your agricultural vehicles and equipment to minimise the need to do maintenance in the field.

2.6 BELT OR CHAIN CONVEYORS

Many agricultural machines use belt or chain conveyors. People can get caught and pulled into conveyors when the machinery catches clothing, fingers, belts, hair, or body parts. This can result in amputation, cuts, crush injuries and sometimes death.

MANAGING THE HAZARD:

Make sure the appropriate guards are in place. Don't wear loose clothing or jewellery (watches, rings, chains), and tie up long hair when working around this machinery.

> Maintain a safe distance to avoid flying crops/debris.

> Where possible, stop the machine before making adjustments.

> Additional precautions may be neccesary where the machine is live during adjustments.

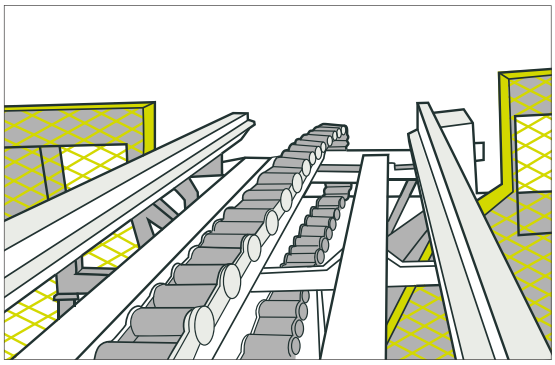

Figure 3: Chain conveyor

2.7 PULLEYS, BELTS, CHAINS AND SPROCKETS

People can get caught and pulled into pulleys, belts, chains and sprockets when the machinery catches clothing, fingers, belts, hair, or body parts. This can result in amputation, cuts, crush injuries and sometimes death.

MANAGING THE HAZARD:

Make sure the appropriate guards are in place. Don't wear loose clothing or jewellery (watches, rings, chains), and tie up long hair when working around this machinery.

Remember to shut down the machine before doing adjustments and maintenance. Always follow the procedures in operating manuals.

2.8 ROTATING DRUMS/DISCS/ DISC MOWERS, HARVESTING HEADS, PROCESSING DRUMS ON MACHINES

The main hazard with these pieces of equipment is when people (particularly those outside the vehicle) contact the machinery, resulting in cuts, amputation, or crush injuries.

Many fatal and serious injuries occur when operators are pulled into combine harvesters at the reel/header unit.

MANAGING THE HAZARD:

Make sure all guards and shields are in place. Keep clear. Make sure everyone else is clear. Stop machinery before you get off or anyone else goes near it.

2.9 CROP UNLOADING/ CROP DISCHARGE

Harvested crops are discharged from certain types of harvesters. If people are nearby, they are in danger of being struck. This can be potentially hazardous.

MANAGING THE HAZARD:

Stay out of the area where crops are discharged from machines. Make sure there is good awareness and communication between operators and those outside the vehicle. Follow established procedures and work patterns.

If everyone follows established procedures and work patterns it is less likely that people will be in the wrong place at the wrong time.

Wear high visibility clothing onsite if working outside a vehicle, so operators can see more easily where you are.

2.10 PINCHING HAZARDS/ ENTRAPMENT

This type of hazard involves getting caught between bits of machinery, like hydraulic implements or harvesters and attachments. This can result in crush injuries.

People most at risk are those assisting, who get caught in the wrong place.

MANAGING THE HAZARD:

Always be aware of where people outside the vehicles are located. Those assisting the driver/operator (ie working outside the vehicle) should wear high visibility clothing.

Ensure the machine has fully stopped before exiting.

2.11 COUPLING AND UNCOUPLING

There is a risk of getting crushed when coupling or uncoupling attachments. When attaching a harvesting implement to the front of a machine (eg harvesting heads) it can slip and crush you, particularly if you are working underneath.

Those assisting an operator with hitching an implement can also get crushed in between the implement and the vehicle as it is moving to connect.

MANAGING THE HAZARD:

If working under machinery, ensure it is adequately supported, eg with stands.

Find a level bit of ground for coupling and uncoupling.

> Follow the operating procedure specific to the machinery you are using.
> Machinery should be immobilized if someone is working underneath it.
> Take your time. Do not take risks.

Don't let anyone stand between the implement and a moving vehicle when coupling.

If you have to move the vehicle when attaching the implement, helpers should step out of the area between the vehicle and implement. If you have to inch the vehicle into position while someone puts in the connecting pins, then:

> back the vehicle up too far
> get the helper to approach
> inch the vehicle forward until the helper can insert the pins.

2.12 LOUD NOISE

Engines and machinery create lots of noise. Operators are exposed to this noise if the vehicle does not have a sound-proof cab. If people operate agricultural vehicles for long periods of time over a number of years, noise-induced hearing loss (NIHL) can develop.

MANAGING THE HAZARD:

If the vehicle does not have a sound-proof cab, always wear hearing protection.

Employers must take action to reduce noise levels if they are above 85dB(A) over an 8 hour day equivalent, or 140dB at peak.

For more information refer to:

> WorkSafe NZ's *Good Practice Guideline: Preventing noise induced hearing loss on farms:* http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/preventing-noise-induced-hearing-loss-on-farms
> the *Approved Code of Practice for the Management of Noise in the Workplace:* http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/acop-%20noise-in-the-workplace

2.13 VIBRATION

Virtually all self-propelled agricultural plant is capable of exposing operators to an unhealthy amount of vibration.

Vibration can be caused by a poorly maintained machine or from being bounced around when travelling over rough ground. If the suspension and seat is not functioning, this can be hard on the operator.

Poor field (surface) conditions are one of the main causes of excessive vibration levels, followed by high in-field forward speeds and lack of harvester (cab and/or axle) suspension systems.

MANAGING THE HAZARD:

Ensure the vehicles suspension and/or tyre pressure is correctly adjusted and maintained. Adjust the seating so all controls are safely and comfortably reached. Take rest breaks and limit daily exposure to vibration.

The first step in reducing exposure to vibration from mobile agricultural plant is to ensure the vehicle's suspension is appropriately adjusted and maintained in line with the manufacturer's recommendations.

However, with some machines, the suspension is in the tyres. If this is the case, make sure the tyres are properly inflated (according to the manufacturer's specifications).

Make sure the seating is safe and comfortable. Check:

- seat height and depth
- back rest height and angle
- forward and backward movement
- seat tilt
- vibration absorbing suspension
- padding for firmness
- partial pivoting if you have to spend long periods looking behind.

If vibration levels are still too high, consider other methods to mitigate the hazard, such as taking rest-breaks, and rotating tasks to avoid vibration exposure.

2.14 EXPOSURE TO GRAIN DUST

Exposure to high levels of grain dust causes ill health, including:

- occupational asthma
- farmer's lung
- grain fever
- chronic bronchitis
- eye irritation and nasal infections.

MANAGING THE HAZARD:

Close the cab door. Make sure the cab filter is of the type recommended by the manufacturer and is fitted and maintained in accordance with the manufacturer's instructions.

2.15 FIRES

Fires can cause serious and fatal injuries. Three things must be present for a fire to occur: air, material that can burn, and an ignition or heat source. Some common causes are:

- grease or oil build-up
- build-up of harvested materials, dust, hay or straw
- bird's nests.

If the machine does catch fire, approach it with extreme caution. Even a small fire can flare up dramatically when doors, hatches, or other areas are opened to gain access. Fires are very dangerous when liquid fuels are involved.

MANAGING THE HAZARD:

Keep the machine clean, remove ignition sources and carry a fire extinguisher.

Regularly remove caked-on grease, oil, crop residue, dry chaff, leaves, bird nests and other material. Clear away wrapped plant materials on bearings, belts, and other moving parts and check them for wear. Make sure the exhaust system is in good condition and leak-free. Check exposed electrical wires for damage or wear.

A fully charged 2kg extinguisher is usually your best source of fire protection. Make sure operators know how to use it. If a fire breaks out, quickly shut off the engine, grab the extinguisher and get out. Try to use the extinguisher's flexible hose to shoot the chemical at the flames' base from a safe distance. Blanket the flames, to starve the fire of oxygen and prevent a re-flash.

Use a mobile phone or 2-way radio to call for help.

2.16 BATTERIES

There is a lot of electrical potential in the batteries. If you touch both terminals simultaneously, or the positive terminal and an earth with something that conducts electricity such as a metal watch or strap, you can be seriously burned. You could also start a fire.

MANAGING THE HAZARD:

Do not contact the positive and negative terminals at the same time, or the positive terminal and an earth.

Follow a safe procedure for changing the batteries. Look out for watches, spanners, screwdrivers, or other metallic objects bridging the terminals.

2.17 OVERHEAD POWERLINES

If any part of an agricultural vehicle contacts overhead powerlines it can be fatal. If an operator contacts the vehicle and the ground, they could be seriously hurt or killed when electricity flows through them.

MANAGING THE HAZARD:

Avoid working near overhead powerlines if possible.

Know the minimum line heights and the maximum height/reach of vehicles and machines passing below or near powerlines.

> Look up before raising implements.

> Think about the height and reach of machinery when buying or hiring replacements.

> Mark lines on a farm map and pass this information on to employees, contractors and other visitors that need to know where they are.

Don't get out of the vehicle if it or an implement touches power lines. Instead, ring for help, warn people not to come near and wait until the power company has made it safe.

2.18 WORKING ALONE AND IN ISOLATION

Farmers often work alone and in isolated conditions. If a farmer has an accident in a remote area, it can be a long time before help arrives. Sometimes the injuries can get worse or the operator could die

MANAGING THE HAZARD:

Tell someone where you are working and when you plan to return. Have regular check-in times – help will arrive more quickly if you do not return.

It is important to have a way to raise the alarm if you are injured, like a cell phone or emergency beacon. Some cell phones have GPS that can easily communicate your location.

Work out an emergency plan with workers and family members so they know what to do if something goes wrong.

2.19 PERSONAL FACTORS

Sometimes fatigue, stress, attitude (eg over-confidence or recklessness), drugs or alcohol can impair operators. This can result in poor judgement, reduced balance, lack of coordination, and a decrease in reaction times, which increases the risk of a serious injury or fatality.

MANAGING THE HAZARD:

Don't operate mobile agricultural plant under the influence of drugs or alcohol. Reassess tasks and find other jobs if there are stress and fatigue issues.

As an employer, make sure operators know the hazards of working with agricultural vehicles, and how their own behaviour and attitudes impact on them.

As an operator, take responsibility and let someone know if you're not up to the job for any reason.

2.20 UNAUTHORISED ACCESS

It can be dangerous if someone drives an agricultural vehicle without the owner knowing or giving permission.

MANAGING THE HAZARD:

Take the keys out of the vehicle and/or put other measures in place to make sure the vehicle is only used with the owner's knowledge and permission.

Do not let untrained workmates or friends operate machines.

03/

DRIVING ON THE ROAD

If you're driving agricultural motor vehicles on the road, follow the road rules. All vehicles driven on the road must be up to warrant of fitness standard, even if it is exempt from having one. Agricultural vehicles operated at speeds greater than 40km/h are required to have a warrant of fitness.

See NZTA's Factsheet 27: *Exempt vehicles from registration and licensing* for a comprehensive guide – http://www.nzta.govt.nz/resources/factsheets/27/docs/27-exempt.pdf

Check that the vehicle and any implement or trailer is not over-width and has the correct signage. See NZTA's Vehicle Dimensions and Mass Rule for more information: http://www.nzta.govt.nz/resources/rules/vehicle-dimensions-and-mass-2002-index.html

WHAT CLASS OF LICENCE DO I NEED?

Agricultural vehicle drivers that drive on New Zealand roads must have at least a Class 1 Driver Licence (a car licence), so they will have studied the road code to get the licence. The road code is the basic guide to safe, legal and considerate road user behaviour in New Zealand.

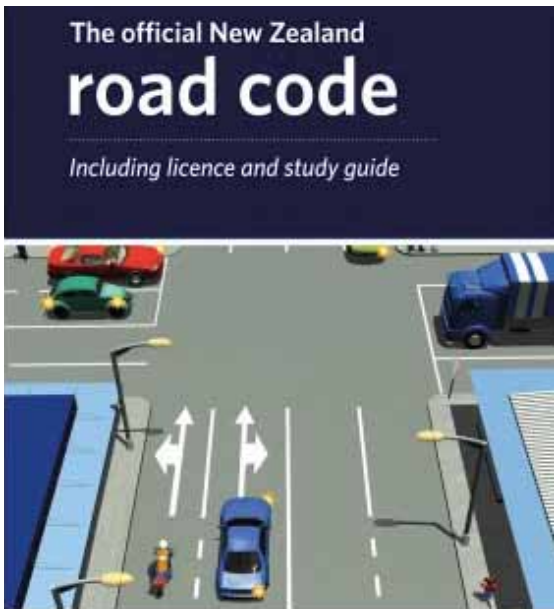

Figure 4: New Zealand road code

In summary, under the Land Transport (Driver Licensing) Rule 1999, Schedule 3:

a. you need a class 1 licence (full and restricted) to drive a agricultural motor vehicle up to 18,000 kg (or in combination of an agricultural tractor and agricultural trailer of up to 25,000 kg) up to 40kph.
b. you need a class 1 licence (full) with wheels endorsement to drive:
   - An agricultural tractor up to 18,000 kg (or combination of up to 25,000 kg) over 40kph
   - other agricultural vehicles up to 18,000kg (eg, combine harvesters) up to 40kph.
c. you need a class 2 licence with wheels endorsement to drive other agricultural vehicles under 18,000 kg (eg combine harvesters) over 40kph.
d. you need the appropriate class of licence for all other non-agricultural vehicles, or agricultural vehicles that exceed 18,000 kg or 25,000 kg in combination.

For the full rules on Driver Licensing see the Land Transport (Driver Licensing) Rule 1999.

Licencing requirements for overseas drivers:

> If you have an overseas motor vehicle licence or permit you are entitled to drive a vehicle of that class in New Zealand for a period of 12 months or until your overseas drivers licence or permit is no longer valid. See (a) to (d) above.

> If you hold an overseas drivers licence or permit to drive agricultural vehicles **only** and New Zealand does not have an equivalent class of licence, you are entitled to drive
the type of agricultural vehicles covered by your overseas licence or permit for a period of 12 months or until your overseas drivers licence or permit is no longer valid. You may not drive any vehicle other than an agricultural vehicle.

> The overseas licence or permit must be written in English or you must also carry an accurate English translation.

There is no requirement to keep logbooks, although work time rules apply, if:

> the vehicle is registered to the owner or manager of the farm or an employee of the farm

> it is being used for agricultural operation of that farm or is being used to transport farm related items, and

> is used within a 50 km radius of the farm.

There is also an exemption from keeping logbooks for a driver of an agricultural harvester that travels less than 50km on a round during the day.

For further information see NZTA's Factsheet 2: *Work time and logbooks* – http://www.nzta.govt.nz/resources/factsheets/02/index.html

For more information about agricultural vehicle road rules, see: http://www.nzta.govt.nz/vehicle/your/agriculture-forklifts.html

DEFINITION OF A ROAD

"Road": includes a street, motorway and beach; and also includes any place to which the public have access, whether as of right or not; and also includes all bridges, culverts, ferries, and fords forming part of any road, street, or place to which the public have access.

For more details of the current road transport and driver licencing rules please see: http://www.nzta.govt.nz/resources/rules/about/index.html

MANAGING ON-ROAD HAZARDS

To read all the rules, check out NZTA's Agricultural Vehicles Guide:
http://www.nzta.govt.nz/resources/agri-vehicles-guide/index.html

04/

TRAINING REQUIREMENTS

Give thorough training to all vehicle operators. As well as training, employers must make sure that people who don't have the knowledge or experience to operate agricultural plant are supervised by an experienced person.

Give all operators information about the working procedures of every machine they are expected to operate and the hazards they will face. Closely supervise them until they prove they can work on their own.

Training should include:

> **Induction:** All workers and contractors should receive information about how to safely operate a particular machine, implement, loader or trailer. This should include information on hazards, control measures, farm rules and policy, and safe work procedures.

> **On the job training:** Experienced co-workers can do this.

> **Direct supervision:** Provide this for inexperienced operators until they reach an appropriate level of competency.

> **Formal training and accreditation:** This provides independent, up-to-date knowledge and good practice. Organise this through a recognised training organisation. Operators should obtain appropriate NZQA qualifications for the class of vehicle they have to operate.

Keep records of induction and training for all vehicle operators.

TRAINING FOR HEALTH AND SAFETY REPRESENTATIVES

The Health and Safety in Employment Act 1992 provides that employers must provide employees with reasonable opportunities to participate in health and safety improvement. One way this can be achieved is by electing a health and safety representative. This is someone employees can go to when they have any concerns or suggestions regarding health and safety in the workplace. The representative will work with the employer in good faith to find a solution.

This representative is allowed to take two days paid leave per year to undergo approved health and safety training.

05/

MAINTENANCE

Different types of agricultural plant will have different maintenance requirements. Nevertheless, the following rules should always be followed:

- Follow the servicing and maintenance instructions provided by the supplier in the operating manual (it will be specific to the machine so, it is the best source of information).
- Plan regular/scheduled maintenance and keep records. Don't just fix things when they break down.
- Do pre-operational checks. Do not use machinery if serious faults are found.
- Report faults/defects.
- When replacing consumables on the machine, the manufacturers operating standards must be followed (including any agrichemical standards and rules).
- Stop all equipment before doing maintenance. Be aware of moving parts.

06/

REFERENCES

IN THIS SECTION:

6.1 GLOSSARY

TERM	DEFINITION
2WD	Two-wheel drive.
4WD	Four-wheel drive
All Practicable Steps	The steps taken to achieve the result that it is reasonably practicable to take in the circumstances, having regard to: 1. the nature and severity of harm that may be suffered if the result is not achieved; and 2. the current state of knowledge about the likelihood and severity of harm that will be suffered if the result is not achieved; and 3. the current state of knowledge about harm of that nature; and 4. the current state of knowledge about the means available to achieve the results and about the likely effectiveness of each of those means; and 5. the availability and cost of each of those means. To avoid doubt, a person required by the Health and Safety in Employment Act 1992 to take all practicable steps is required to take those steps only in respect of circumstances that the person knows or ought reasonably to know about. (Section 2A Health and Safety in Employment Act 1992)
Auger	A mechanism that uses a rotating helical screw blade, called a "flighting", usually within a tube, to move liquid or granular materials.
Counter-weight	A weight that can be attached to the front or rear of the tractor to offset the weight of other front or rear mounted implements. The counter weight ensures the weight of the tractor and implements is appropriately distributed over the front and rear wheels, improving traction and stability.
Decibel	The unit used to indicate how loud a noise is (it includes sound pressure level and other acoustic quantities), 'dB' for short, or 'dB(A)' energy at the ear.
Diff-lock	A locking differential that provides increased traction compared to a standard or "open" differential by restricting each of the two wheels on an axle to the same rotational speed without regard to available traction or differences in resistance seen at each wheel.
FEL	Front-End Loader. An articulated hydraulic lift arm (most-often detachable) with a bucket or scoop that fits on to the front of a tractor for digging and loading earth and other substances.
FOPS	Falling object protective structure. A reinforced cab or safety frame designed to protect the driver/passenger from objects that fall onto the cab.
Forks	An implement most-often connected to the front-end loader for lifting and impaling loads such as hay bales.
Implement (mounted or trailed)	An agricultural machine attached to a tractor for the performance of mechanized operations and processes in agricultural production; eg plowing, harrowing, mowing.
Lift ratings	See load rating.
Load rating	The maximum load for which something is designed.

TERM	DEFINITION
NIHL	Noise Induced Hearing Loss. A hearing loss disorder that results from exposure to high-intensity sound, especially over a long period of time.
PTO	Power Take Off. A system comprising a splined output shaft on a tractor (usually on the rear of the tractor between the three-point linkage), designed so that a drive shaft can be easily connected and disconnected, and a corresponding input shaft on the application end. The power take-off allows implements to draw energy from the engine of the tractor.
Quick hitch	A system attached to the three-point linkage that is designed to allow implements to be attached in a faster, easier manner.
ROPS	Roll Over Protective Structure. A reinforced cab or safety frame designed to protect the driver/passenger from crush injuries in the event of a rollover by creating separation between the tractor and the ground.
Three-point linkage	A system for attaching implements to the tractor. It comprises three hitch-points that create a triangle shape and allow the weight of the implement to be carried by the tractor itself. Unlike a trailer, for example, which may support its own weight.
Tines	Prongs or sharp points, such as those on a fork.
Tow eye	The hole in the tractor drawbar through which the hitch-pin is inserted to connect trailers and other implements.
Wheel-brake	Brakes which apply to specific wheels. Wheel brakes can be used to help the tractor make sharp turns.

6.2 BIBLIOGRAPHY

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Notes

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