

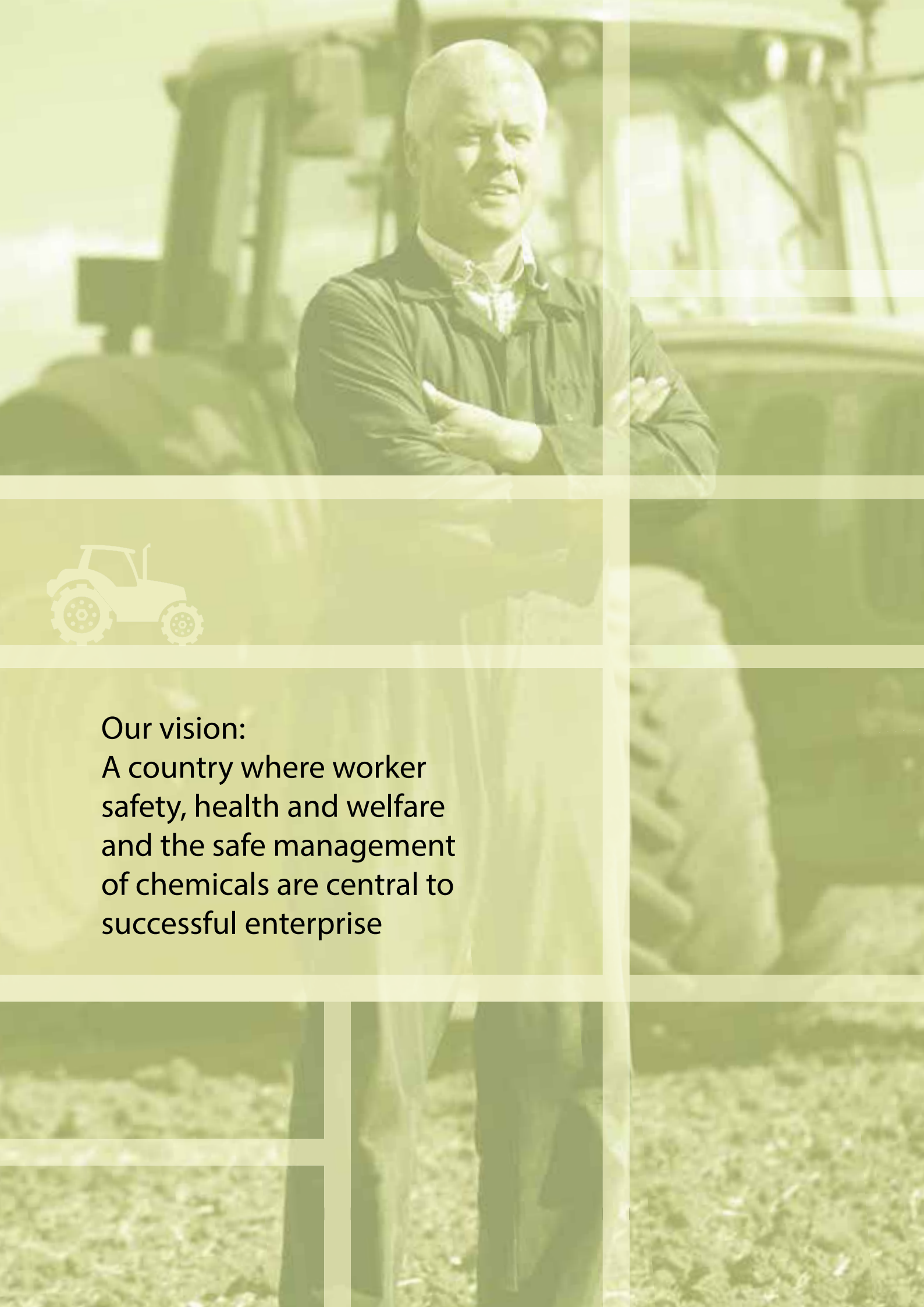


HEALTH AND SAFETY
AUTHORITY



Guidance on the Safe Use of **Tractors and Machinery** on Farms





Our vision:

A country where worker safety, health and welfare and the safe management of chemicals are central to successful enterprise



1	Scope	8
2	Introduction	9
2.1	Machinery related hazards	9
2.2	Additional risks	11
2.3	Purchasing machinery	14
2.4	Start using the machinery	15
2.5	Safe use of machinery	15
3	Causes of tractor and machinery accidents	16
4	The Law	19
4.1	The Safety, Health and Welfare at Work (General Application) Regulations 2007	20
5	Children –Should not to be put at risk	21
5.1	Riding on tractors and machinery	21
5.2	Operating tractors	22
5.3	Operating machinery	23
6	Fatigue as a safety factor	24
7	Safe operating procedures	25
7.1	Know the controls	25
7.2	The “Safe Stop” procedure	25
7.3	Speed as a factor in tractor and machinery accidents	25
7.4	Mounting and dismounting the tractor or machine	26
7.5	Seats for passengers	26
7.6	Seat belts	26
7.7	Clothing and PPE (Personal Protective Equipment)	27
8	Assessing the hazards	28
9	The nature of the mechanical hazards	29
10	Guarding as a factor in preventing accidents	30
	Case studies:	33



11	Safety when operating on public roads	35
11.1	You must have the class W driving license	35
11.2	Entering or exiting the road	36
11.3	Operating tractors and machinery on motorways	36
11.4	Watch for following traffic	37
11.5	Over-size loads on roads	37
11.6	Muck on the road	38
11.7	Lighting	38
12	Operating safely on hills and slopes	39
12.1	Speed as a control and stability factor	39
12.2	Centre of gravity as a stability factor	40
12.3	Turning on slopes	40
12.4	Number and quality of the wheel brakes	40
12.5	Adequate roll over protection	40
12.6	Safe driving on slopes	41
13	Maintenance as a safety factor	42
13.1	Clearing a blockage	42
13.2	'Jump Starting' a tractor or self propelled machine	43
13.3	The daily check – before you start work	43
13.4	Scheduled maintenance	43
13.5	Leaking or damaged hydraulic hoses	44
13.6	A safe and tidy workshop	45
13.7	Inflating tyres/Changing wheels	50
14	Buying machinery	54
15	Training as a safety factor	55
16	Further reading	56
	Appendix 1 – Tractor safety	57
	Accidents with tractors	57
	Tractors - Key safety points	57



Driving the tractor	59
Training	60
Tractor Braking.....	60
Roll over protection	61
Safe hitching/unhitching.....	61
Maintenance work on tractors	62
Servicing	62
Inflating tyres/Changing wheels.....	62
Case studies – Tractors.....	63
Appendix 2 –Quad bikes (ATV’s).....	64
Personal Protective Equipment	65
Typical Quad helmet	65
Safety checks	66
Driving a Quad	66
Route planning.....	68
Trailed equipment and loads on quads.....	68
Using sprayers	69
Children.....	70
Roll bars, lap straps and weather cabs	70
Road use.....	71
Case studies - Quads	71
Appendix 3 –Trailers.....	72
Trailers - Key safety points.....	72
Trailer brakes	73
Stability of loads	73
Wheels and tyres	74
Lighting of trailers	74
Case study - Trailers with a tipping body	75



Driving with a trailer	76
In the field	76
In the yard	76
On the road	77
Case studies - Trailers	77
Appendix 4 - Front-end-loaders and farm tele-handlers	78
Front end loaders	78
Front-end-loader - Key safety points	78
Tele-handlers (Telescopic handlers)	79
Tele-handlers - Key safety points:	80
Case studies – Front end loaders and telescopic handler	81
Appendix 5 - Harvesting machinery	82
Grass mowers and toppers	82
Grass mowers and toppers - Key safety points	82
Forage harvester	83
Forage harvester - Key safety points	84
Case studies – Forage harvester	85
Balers	85
Risks with balers	85
Balers - Key safety points	86
Potato harvesters	87
Potato harvesters - Key safety points	88
Case study – Potato harvester	89
Combine harvesters	89
Combine harvesters - Key safety points	90
Appendix 6- Spreading machinery	92
Slurry tankers	92
Slurry tankers - Key safety points	92



Case studies - Slurry tankers	92
Fertiliser spreaders	94
Fertiliser spreaders - Key safety points	94
Case studies - Fertiliser spreaders	95
Appendix 7 – Post driving equipment	96
Post driving equipment - Safety checklist	96
Post driving equipment - Key safety points	97
Appendix 8 – Diet feeders	98
Diet feeders - Key safety points	98
Case studies - Diet feeders	99
Appendix 9 – Hedge cutters	100
Hedge cutters - Key safety points	100
Case study - Hedge cutters	102
Appendix 10 - Revised standards applicable to agricultural vehicles	103
Braking	103
Lighting & visibility	103
Weights, dimensions & coupling	103
Plating & speed rating	103
Brakes	104
Lighting	104
Weights and dimensions	104
Spillage, road debris	105
Licensing & insurance	105



Abbreviations Used

ATV	All-terrain vehicle, normally a quad bike
EN	European Norm
FRS	Network Farm Relief Service
IP	Index Protection (electrical safety)
PPE	Personal Protective Equipment e.g. dust mask or safety boots
PTO	Power Take-Off Shaft
Teagasc	Irish Agriculture and Food Development Authority
RSA	Road Safety Authority

1 Scope

This guidance is intended for all those who use tractors and machinery in Irish farming. The scope includes their use on dairy, beef, sheep, equine, pig, poultry, mushroom and tillage farms, plant nurseries and vegetable producers.





2 Introduction

There is no doubt that modern agriculture is absolutely reliant on the efficiencies that come with the use of tractors and machinery. They create labour saving efficiencies that are at the very core of the modern system. Because of their large size, weight and immense power they also create a huge danger to the operators and those people who are close by.



Impact & crushing while reversing is a common cause of fatalities

Tractors and machinery collectively are the main cause of fatal accidents in agriculture.

This has not changed in at least 30 years, though the total numbers of accidental deaths in agriculture has declined. Between 2005 and 2014, of the **193** people killed in agriculture **94** have been killed in farm related accidents involving vehicles and machinery.

In addition, there are large numbers of serious injuries involving the use of tractors and machinery. The effects of a tractor or machinery accident are more likely to be catastrophic, causing death or very serious injury.

The resulting injuries can ruin the lives and the livelihoods of farming families. Good farm management must always include the management of health and safety within the farm business. Simple and low-cost solutions will usually prevent accidents and serious injuries.

Machinery accidents can be prevented by keeping the machine in good working order, ensuring the operator is competent, ensuring safe stopping of the machine and adopting practical and safe working methods.

2.1 Machinery related hazards

While machinery primarily makes our lives easier it can also be responsible for a number of health and safety problems.



Safe operation is the most important safety factor



Operating machinery may expose the user to various hazards, associated with movement or mechanical actions, typically:

- Revolving shafts, chains, wheels or discs
- Revolving augers, worms or spirals in casings
- Revolving drums, spiked cylinders or beaters
- In-running nip points
- Reciprocating, oscillating or sliding motions



Entanglement is a common cause of injury

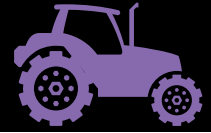
An easy way to consider machinery hazards is to ask yourself five basic questions in relation to any machine and consider the possible severity of injury:

1. **Traps;** Can I suffer an injury from it trapping a limb or being crushed in any closing motion or passing movement? For example; silage shears, crushed by slow rolling vehicle.
2. **Impact;** Can I suffer an injury due to speed of movement? For example; being struck by moving vehicles, hammer of a post driver.
3. **Contact;** Can I suffer an injury following contact due to sharpness, electrically live, hot or cold? For example; chainsaw blade, circular saw.
4. **Entanglement;** Can I suffer injury due to being drawn into the machine or entangled in its moving parts? For example; PTO shaft, flail hedge cutters, combine harvester.
5. **Ejection;** Can I suffer an injury due to materials being worked on by the machine being ejected, thrown out at force from the machine? For example; timber mulching machine, circular saws.

It is important to note that a machine may pose more than one of the risks above

(Example: A circular saw can cause severe injury due to contact with the cutting blade, but can also present a risk of injury from timber being ejected) or

(Example: A combine harvester can cause an impact injury due to you being struck by the machine, but it can also injure you by being pulled into the machine by entanglement, etc.)



To be successful in controlling the risks from machinery it is important to realise that while guarding is essential and must be kept in place, you cannot rely simply on mechanical guarding. You also need to ensure appropriate behaviour around machinery, ensuring that simple rules are followed and that appropriate supervision is also applied,

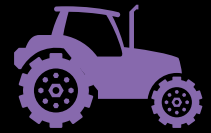
(Example: applying appropriate vehicle speed limits in yards, switching off machinery before clearing any blockages, applying safe stop procedures, using a push stick at the circular saw, etc.)

Many machinery accidents occur during machinery maintenance or set up, or when dealing with unexpected breakdowns and during poorly planned maintenance. Only competent persons should be involved in such work.

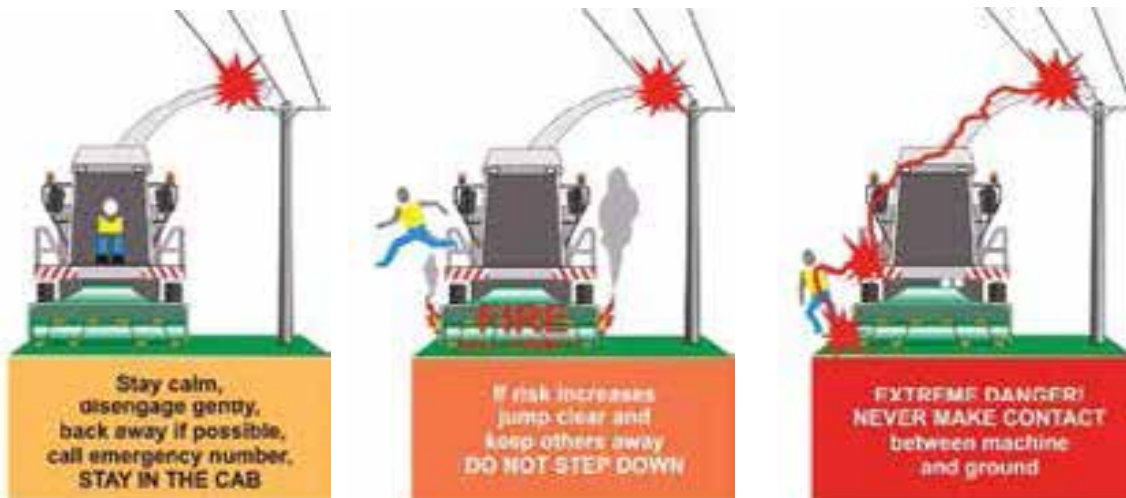
2.2 Additional risks

Additional risks exist which are not purely mechanical including electrical, hydraulic, temperature, fire, vibration, noise, etc.





What to do in case of emergencies



Keep people well clear of possible electrified equipment and fallen wires.

Call ESB emergency @ 1850-ESB-999

(easier to remember than 1850-372-999)

Electricity related hazards– include:

- electric shock due to direct contact with live parts (accidental contact with parts that are normally live) or indirect contact (contact with parts that have become live due to a fault) causing severe burns or death
- fire or explosion due to electric sparks or due to overheating of electrical equipment.

Example: contact with worn cables of welding machine, fire on combine due to contacting overhead lines.





Extreme temperatures :

- contact with or proximity to hot machinery parts causing, pain and burns,
- contact with very cold parts can cause numbness or frostbite

Example: contact with part of machinery that has been in operation

- **Noise emission:** prolonged exposure to noise from machinery is the main cause of noise-induced hearing loss. It is important to note that hearing damage of this nature cannot be rectified by the use of hearing aids. The damage to hearing is cumulative and irreversible but most of the time the person exposed to the noise is not aware of it causing damage. Exposure to very loud bursts of noise can cause sudden temporary loss of hearing. Long-term exposure to noise is also associated with other hearing disorders such as tinnitus (a continuous ringing sound in the absence of an external source).

Example: use of chainsaw & other noisy machinery

- **Vibration:** exposure to vibrations transmitted through the feet or the seat to the whole body can cause or aggravate musculoskeletal disorders such as back pain and damage to the spine. Exposure of the hand /arm system to vibrations can cause damage to blood vessels in fingers and hands (vibration white finger disease) and damage to the peripheral nervous system, tendons, muscles, bones, joints of hands and arms. This is exacerbated by smoking which narrows the blood vessels.

Example: Operation of Tractors and Machinery over rough terrain

- **Slips, trips and falls** – applies to parts of machinery where persons may have to stand or gain access to, such as work platforms, gangways, walkways, footboards, ramps, steps, stepladders, ladders, floors etc.
- **Cuts or puncture risks**, e.g. from corroded metal parts, when using machinery with blades such as hedge cutters, etc.



2.3 Purchasing machinery

When you purchase any piece of machinery, tool, accessory or other equipment, have a few things in mind:

- Is it the right machinery for the job?
- Does it allow you to do the work safely with ease, speed and convenience?
- Does it bear the CE mark and have a certificate of conformity as a proof of conformity to the relevant directives/ standards?
- Is the operator's seat/ cabin easily accessible by the operator (steps, ladders, doors)?
- Can you evacuate it easily and quickly if the need arises?
- Is the operator's seat ergonomic and are controls ergonomically positioned, easy to reach and handle?
- Are there arm, back and foot rests?
- Have measures been taken to reduce the operator's exposure to vibration?
- Is it equipped with a warning beacon?
- Is it equipped with air-conditioning and dust filter?
- What is the noise level of the machinery? Have noise absorbent fittings been installed? Is the cabin noise insulated?
- Is the visibility of the operator unobstructed?
- Is the operator protected from fumes?
- Is there a need for safety belts – are they provided?
- Is there a need for emergency stop buttons or power take-off (PTO) cut out switch?
- Has the manufacturer provided basic safety features for protection from rollover, falling objects, penetrating objects, and fire?
- Who can carry out maintenance work on it?
- Who will carry out training on its safe use?
- What warranty, training, back-up will be provided by the supplier?

By posing the right questions at the purchasing stage, you can prevent problems from cropping up later.

Machines and equipment must be used in accordance with the instruction manual.



2.4 Start using the machinery

Before you start using any machinery, it is vital that you fully understand how to use it safely. **Never attempt to operate machinery or allow anyone else to operate it unless they know how to use it properly and safely.** Once the machinery is up and running you may find it difficult to control, manoeuvre, stop or change its mode. If the supplier is going to provide training or if you decide on reading the instructions in detail yourself, make sure you have no doubts about its various functions and safety precautions.

2.5 Safe use of machinery

Always use machinery according to the manufacturer's instructions. Make sure that safety guards on moving parts of machinery or transmission shafts are in position at all times. Do not remove safety guards or override emergency stop functions.

Reduce the risk of entanglement in moving parts by avoiding loose coats or jackets, loose sleeves, untied shoelaces, jewellery, loose collars, loose hi-vis vests and long hair. Do not operate the machine if you have consumed alcohol, taken drugs or taken medication that may cause drowsiness. Do not operate machinery if you feel sleepy, tired or unwell, if you are not adequately trained and if weather conditions limit visibility or make the use of the machinery unsafe in any way.





3 Causes of tractor and machinery accidents

The major causes of tractor, vehicle and machinery related fatal accidents are summarised in Figures 1 and 2.

Tractors, farm vehicles and machinery account for almost half of all fatal accidents on farms (49% of farm deaths in the ten year period 2005 to 2014).

Figure 1: Deaths due to Machinery in 10 year period (2005-2014)

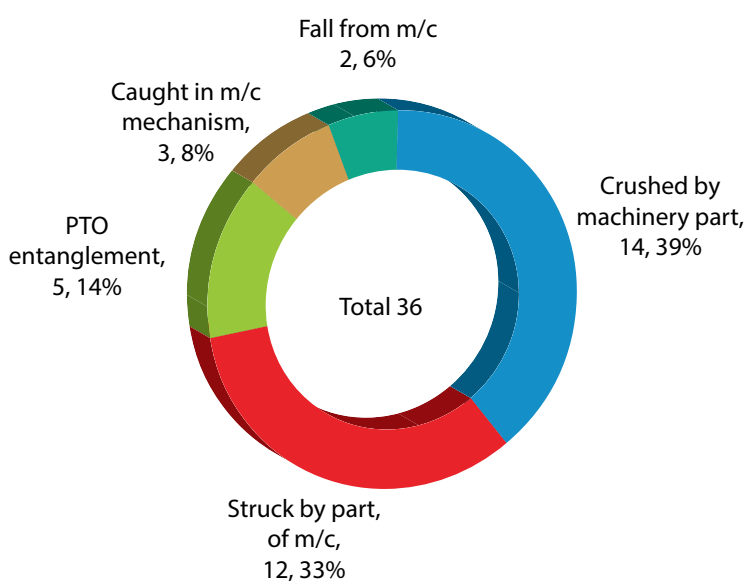
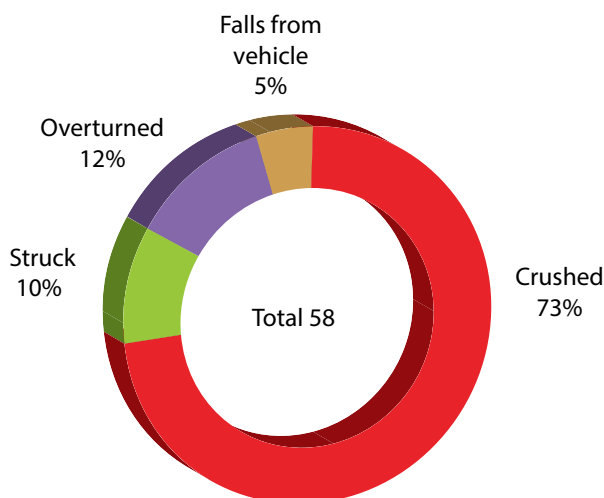


Figure 2: Deaths due to Vehicles (Tractors, Quads, Farm vehicles) in 10 year period (2005-2014)



3 Causes of tractor and machinery accidents



Most accidents with tractors and farm vehicles are caused by:

- Inexperienced drivers
- Poor mechanical condition
- Excessive driving speed
- Lack of concentration
- Steep gradients, and
- Unguarded moving parts



Key messages:

- Elderly farmers are at serious risk when working with tractors and machinery. 33% of deaths to older farmers (over 65 years of age) in the 10 year period 2005-2014 were associated with the use of tractors and machinery
- Young children are at even greater risk– they are less predictable and much less visible. 68% of the fatal accidents to children on farms in the period 2005-2014 were associated with the use of tractors and machinery
- Machinery with unguarded moving parts creates a much higher risk
- Fatigue is a factor in many tractor and machinery accidents
- Excessive speed for the conditions is another common factor
- Hilly terrain is commonly a factor
- In most years there are fatal accidents on public roads where tractors or machinery are involved



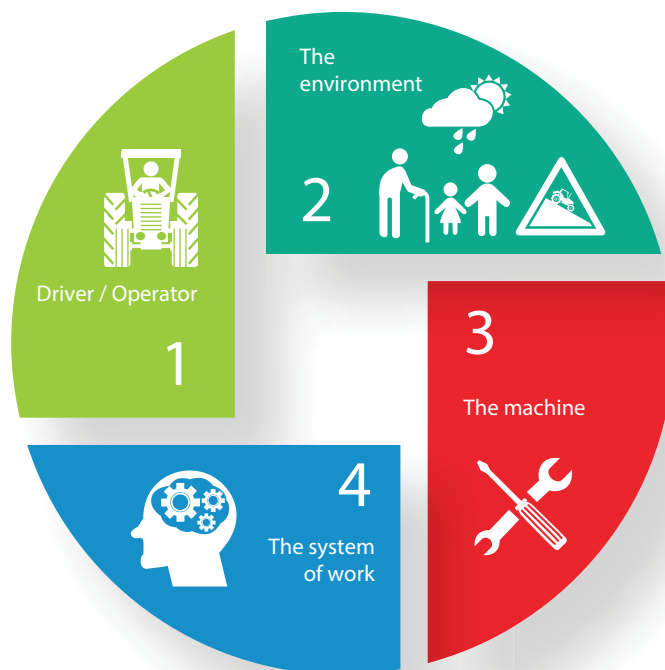
3 Causes of tractor and machinery accidents



The safe use of tractors and farm machinery depends on just **four** critical factors, represented in the diagram below:

1. The competency of the **driver** or operator.
2. The safety of the **machine** – for instance guarding, its maintenance and safety features.
3. The wider **environment** – such as slopes, drains and ditches, proximity of children or elderly, the weather or soil conditions.
4. The **system of work**. Is it planned or does it just happen? Are the basic rules of safe work considered and followed?

If any one of these is not correct then safety is always compromised.



In nearly all tractor and machinery accidents there is one common factor, the driver. The driver is ultimately in control and makes the decision on how to approach and do the work. If the basic rules are followed by a competent driver then most accidents will not occur.



4 The Law

The following legislation, regulations and Codes of Practice are directly applicable to the safe use of tractors and machinery on Irish farms:

- Safety, Health and Welfare at Work Act 2005
- Safety, Health and Welfare at Work (General Application) Regulations 2007
- Machinery Regulations SI 407/2008. This implemented the Machinery Directive 2006/42/EC
- Code of Practice for Preventing Injury and Occupational Ill Health in Agriculture 2006 (http://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Agriculture_Code_of_Practice.html)
- 2010 Code of Practice on Preventing Accidents to Children and Young Persons in Agriculture 2010 (http://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Code_of_Practice_on_Preventing_Accidents_to_Children_and_Young_Persons_in_Agriculture1.html)

A number of additional EU Directives and Irish Regulations are also applicable, in particular the Road Traffic Regulations (www.rsa.ie) and the Tractor Directive 2003/37/ (www.agriculture.gov.ie)

Failure to comply with these is an offence punishable with both fines and possible imprisonment.



The **Machinery Directive** applies to all machinery used on farms. It applies to the designers and suppliers of machinery. It is focused on the principles of safety being built into design, manufacture, control systems, protection against mechanical hazards, with defined requirements for guards and protective devices. As far as possible, the Directive aims to engineer out the hazards associated with machinery.

The **Tractor Directive** deals with type-approval of agriculture or forestry tractors, their trailers and interchangeable towed machinery. The Department of Agriculture, Food and the Marine have responsibility for this directive.



4.1 The Safety, Health and Welfare at Work (General Application) Regulations 2007

Chapter 2 of Part 2: Use of Work Equipment transposes Council Directive 95/63/EEC on the use of work equipment. The general requirements apply to work equipment in any location, including agriculture locations.

Key common themes of the legislation are the requirements for the following:

- Safe plant and equipment (2008 Machinery Regulations and the 2007 General Applications Regulations)
- Safe systems for doing the work
- Competent and adequately trained operators / workers

The legislation applies equally to paid employed workers, family labour, contractors and self-employed farmers. There are no exceptions.





5 Children – Should not to be put at risk

The Code of Practice on Preventing Accidents to Children and Young Persons in Agriculture is in place since 2001. The aim was to eliminate all deaths and serious injury to children and young persons, while recognising that the culture in Ireland was for children to commence some work on farms while they were still at school. This Code of Practice was revised in 2010.



Always consider risks to children on the farm

The following definitions are detailed in the COP:

- A “child” is a person under 16 years of age or the school leaving age, whichever is the higher
- A “young person” is a person who has reached 16 years of age or the school leaving age, whichever is the higher, but is less than 18 years of age
- The term “minor” encompasses both “child/children” and “young persons”



Provide safe play areas away from work activity

The Code of Practice on Preventing Accidents to Children and Young Persons in Agriculture sets out the following:

5.1 Riding on tractors and machinery

Children under the age of 14 should be prohibited from riding on agricultural machines including agricultural trailers with the following exception –

If a risk assessment shows it to be safe, children between the ages of 7 and 16 may ride on a tractor provided the tractor is fitted with a properly designed and fitted passenger seat (with seat belts) inside a safety cab or frame.



If carried in the cab children must be given strict rules to follow such as keeping seat belt on at all time, not distracting the driver, not to leave the cab without permission, not to touch or interfere with controls, etc.

Children under the age of 7 must not be present inside the cab of a tractor or machinery which is in use whether an instructor/passenger seat is provided or not.

5.2 Operating tractors

Children under the age of 14 must not be allowed to drive or operate tractors or mechanically propelled machines such as Teleporters, Jeeps, Quad's etc.

In addition to this, a child or young person aged 14 or over should only be permitted to drive a tractor or mechanically propelled machine on the farm, if;

- they have attended a formal training course run by a competent training provider, and have received adequate instruction in the safe operation of the particular tractor or mechanically propelled machine they are driving and fully understand the purpose of all the controls and the effect of their improper use,
- they are closely supervised by a responsible adult,
- they have the ability to operate the controls with ease,
- all the controls are conveniently accessible for safe operation when seated in the driver's seat,
- the controls which operate the power take off (PTO) devices, hydraulic devices and engine cut-off are clearly marked to show the effect of their operation,
- the tractor or mechanically propelled machine is maintained so that it is safe for them to operate,
- the ground over which the tractor or mechanically propelled machine is driven is free from hazards such as steep slopes or excavations, river banks, lake or pond edges, deep ditches and similar areas,
- no other child or young person is present on the tractor or mechanically propelled machine,
- other than for the purpose of supervision or instruction, no other person is on any trailer or other equipment being towed,
- in relation to Quad's that you consider the Manufacturer's minimum age recommendations, and
- no other person is in the immediate vicinity.



5.3 Operating machinery

Minors should be prohibited from driving, or operating, the following:

- Towed/self-propelled harvesters and processing machines (except those machines designed for operation by people in addition to the driver and where the young person is on the operating platform and under the supervision of an adult)
- Trailers and towed machinery with built-in conveying, loading, or spreading mechanisms
- Power-driven machines incorporating cutting, splitting, grinding or crushing mechanisms (including chainsaws)
- Chemical applicators of any sort, including hand-held equipment
- Machines incorporating power-driven soil engaging parts
- Ditching and drainage machinery
- Material handlers including skid steer loaders, lift trucks and track-laying vehicles
- Slurry tankers
- Powered feed-preparation equipment

NB: The list above is not exhaustive

In addition, minors should not be allowed to help in maintenance or cleaning operations on such machines.



Children should be kept away during busy work activity



6 Fatigue as a safety factor

There is evidence that operator fatigue is involved in many accidents with tractors and machinery. The very nature of the farming cycle means that extended hours are worked at some times of the year, particularly at calving and lambing, and at harvest time. In addition, many farmers have another job, meaning that their farming activities often take place at the end of an otherwise busy day or at the weekend, and usually involves use of tractors and machinery.

This is a real dilemma for nearly every farmer, as the cows will calve in their own time, cattle have to be fed and milked every day, and when the corn or silage is ready it has to be harvested.

Besides the physical effects of fatigue, it may also be a stressful time and have mental effects. Fatigue and depression tend to reinforce each other in an often “vicious cycle”. “Chronic fatigue syndrome” or “burnout” causes both physical and mental symptoms.

Learn to recognise the **symptoms of fatigue**¹ :

- Frequent yawning or blinking
- Slower reaction times
- Difficulty in making correct decisions – “too tired to think”
- You complete tasks in the wrong sequence – such as not completing the “Safe Stop” before dismounting a tractor or harvester
- Forgetfulness - You forget key steps and procedures
- Your physical ability is lower

Better planning of the work cycle, getting in extra help when it is needed, proper nutrition from good food and staying hydrated can all help to manage fatigue.

Stimulants like strong coffee may have short term effects in improving your concentration or awareness but **the only cure for fatigue is proper rest.**

¹ See ACC Bulletin 404, 2002 on www.acc.co.nz



7 Safe operating procedures

7.1 Know the controls

You must never operate any machine until you are fully familiar with the controls. Before you do any work you must be comfortable and confident that you have the skills to do the job. If not, you must be closely supervised or leave the task to someone else.

7.2 The “Safe Stop” procedure

The “Safe Stop” is easy to follow and may prevent many serious accidents:

1. Bring the tractor and machine to a stop.
2. Disengage the gearbox and the drives – whether PTO or Hydraulic.
3. Apply the handbrake firmly.
4. Lower implements to the ground.
5. Switch off, remove the key.
6. ONLY NOW CAN YOU GET OFF.

The only exceptions should be where the drive needs to be left running, as in a Slurry Agitator or pump, an irrigation pump or a generator.

If fully implemented the “**Safe Stop**” Procedure would by itself eliminate most crushing, shearing and entanglement machinery injuries and deaths around farm yards. Always apply the ‘Safe Stop’ Procedure before leaving the seat of the tractor or other machine.

7.3 Speed as a factor in tractor and machinery accidents

Most tractors in use in Ireland have a top speed of about **50 km/hr** (30 mph). Newer models with independent suspension on each front wheel often have a road capability of up to **80 km/hr**. (50mph). Nearly all tractors have a high Centre of Gravity, which causes them to have inherent instability especially when driven at speed or on uneven ground. The swaying and rocking on uneven ground can be enough to tip a tractor over, especially if you are travelling at speed.

Tractor drivers always need to remember that speed kills. Take particular care when cornering, particularly when pulling a load. The faster you travel on the tractor the less time there is to react in an emergency.



7.4 Mounting and dismounting the tractor or machine

There must be steps to climb up or dismount, they must be kept clean and free of items such as chains and there must be handholds.

Never;

- dismount frontwards – you must always be facing the machine and take it a step at a time, a fall forwards off the steps can cause serious injury,
- jump from the top step – this has caused many broken ankles or damaged knee ligaments, and
- dismount until the tractor has come to a full stop and the handbrake is applied – as in the “Safe Stop”.

You must have appropriate work boots – be they steel toe capped Wellingtons or Safety Boots and their tread must be suitable for slippery surfaces.



Any passenger must remain seated while tractor is moving

7.5 Seats for passengers

All tractors are designed primarily for operation by one person. Many modern tractors and harvesters may have an additional seat for a passenger (only one extra seat). The extra seat must be firmly attached and have a lap seat belt. There is no circumstance where more than one passenger should be carried.

Never carry passengers on the tractor mud guards, tractor linkage or on the drawbar of a trailer.

7.6 Seat belts

The main role of the seat belt is to hold you in position should an accident occur. Some fatalities with tractors have occurred because the driver was thrown out of the cab. On combine harvesters following an impact there is a risk of falling through the windscreen. Using the lap seat belt avoids these risks.



7.7 Clothing and PPE (Personal Protective Equipment)

- Wear safety boots with steel toe caps for all work with tractors and machinery
- Your clothing should be tight fitting so it is less likely to get caught up
- If wearing a high visibility vest it should be zipped up or fastened so it can't flap in the breeze or become entangled in machinery
- Avoid having loose drawstrings on clothing
- Long hair should be tied up or secured in a cap if you are working near machinery.
- If it is likely to be wet or cold then make sure your clothing is adequate to protect you should the machine break down

PPE can include the following:

- Safety boots or wellingtons with steel toe caps and sole plate
- Long sleeved overalls or coveralls
- Ear muffs
- Safety glasses complying with EN 166
- Dark glasses if glare is extreme
- Respirators complying with EN 149
- Sun hat
- Safety gloves

If you need PPE make sure to have it available before the job starts. Think ahead about what you will need to work safely.



8 Assessing the hazards

There is **always** a legal onus on the driver to assess the risks on a job before the work starts and periodically as it progresses. This is **fundamental** to safe work – in order to protect you the operator, or others working with you, from the risk of injury.

You should check that:

- The machine is suitable for the job?
- All machinery controls are working properly?
- It is fully serviced?
- You have looked at the site? For example, low power lines, hidden ditches or stumps in long grass, children in the area, slippery surfaces or steep slopes.
- You are up to the job?
- You are familiar with all of the controls?
- You are not tired before even starting?
- You are wearing suitable clothes, PPE and boots?
- You know enough to do this job safely?

You as the operator must do these checks – no one else will do it for you.

Don't start the job unless everything is in place.





9 The nature of the mechanical hazards

There are many ways of getting injured from tractors and machinery²:

- Crushed by moving vehicles or machines
- Amputations
- Crushed or cut by shearing action, where parts of machines move past each other or stationary objects causing a shear point
- Entanglement where the machine pulls you in. Most commonly with augers or PTO's
- Drawing-in or trapping as with round balers, forage harvesters and combine harvesters
- Impact injuries when struck by a machine or machine part as with post drivers, hedge trimmers or fertilizer spreaders
- Stabbing or a puncture wound. There are many sharp points that are hazardous during maintenance work
- Friction or abrasion injuries from conveyor belts
- Injection of high pressure fluids, most commonly from a burst hydraulic hose
- Electrocutation where machinery or equipment makes contact with overhead electrical power lines

Other hazards associated with machines include electrical hazards, hot surfaces, high levels of noise and vibration, poor visibility and ergonomic issues.



10 Guarding as a factor in preventing accidents

In general there are two types of guards on tractors and farm machinery, fixed guards and interlocking guards. Fixed guards are used to cover chain drives and usually require tools to remove them.

A number of machines have interlocking guards. This means that when the cover is open, the machine will not start. Interlocking guards must never be bypassed.

Any unguarded moving part on a tractor or machine is an entanglement or drawing-in hazard. The most obvious and common example is the PTO shaft and that alone still causes many severe injuries and farm deaths almost every year. It takes less than 1 second to become entangled by a PTO shaft revolving at 540 rpm. You have almost no chance of avoiding serious injury or death once you are caught in a PTO.

By law, where it is practicable, all moving parts on all machinery must be guarded. If you can install a guard then it is an offence not to have this in place whilst the machine is in use.

Other common examples where moving parts should be guarded are:

- Chain or belt drives on diet feeders, slurry tankers, muck spreaders and forage or combine harvesters
- Belt or chain drives on conveyors, compressors and vacuum pumps in dairy parlours
- Grain augers



Learn how to fit and maintain your PTO Guards



A proper PTO Guard can reduce entanglement risk to Zero



Where someone has to work in the proximity of a moving belt or chain, such as on the picking table of a potato harvester or on a potting machine in plant nurseries, there must be an emergency cut-off switch that can be used by the person who may become entangled. This immediately cuts off power to all moving parts.



Interlocked guards stop the machine when opened

Safety guards are designed to prevent access to dangerous areas and moving parts which could cause injury.



Always read the operator's manual

Power Take-Off shafts (PTO)

Power take-off shafts are an efficient means of transferring mechanical power between tractors and farm machinery. However, a tractor power take-off (PTO) and the power take-off drive shaft of a machine are very dangerous.

Every year people are seriously injured or killed in accidents involving PTO's.

The PTO shaft cover must comply with EN ISO 5674. Many PTO shaft covers in use are not properly installed or are damaged. The shaft must be chained at each end and have a 'bonnet' at each end to guard the connection to the tractor or the implement. With the tractor this is the "U Guard" attached to the tractor itself and the O guard on the implement end.



The “Safe Stop” procedure will help avoid most cases of entanglement. If the moving parts are stopped then you can’t get caught.

Power Take-Off maintenance;

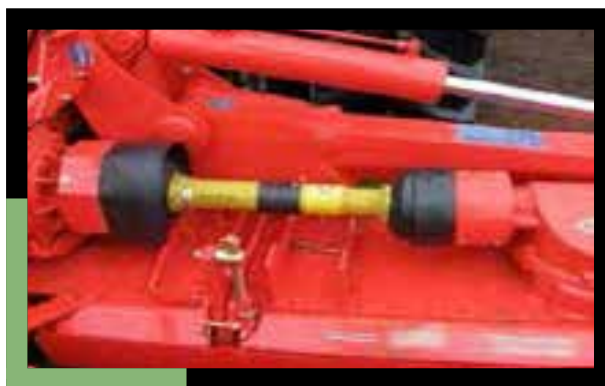
- The PTO cover must provide continuous protection over its full length, both when closed and when extended
- It must be smooth, undamaged without cracks
- Clean and lubricate regularly and support the guard when not connected to avoid damage to it
- Make sure no one uses adaptors to allow a 21 spline 1000 rpm shaft to drive a 6 spline 540 rpm shaft
- Always use the correct shaft and engine speed to work safely and efficiently



Ensure you fit the PTO Guard properly

Many serious farm accidents have involved PTO shafts. In most cases the accident occurred when the machine was stationary, for example when handling slurry or mixing and grinding grain for animal feed.

Loose clothing is much more likely to become tangled. Many PTO shaft accidents have occurred because clothes got caught up. Likewise, flapping ‘high-vis vests or jackets’ are extremely dangerous in the vicinity of fast moving belts, shafts and chains. Either zip them up or remove them entirely if there is any risk of entanglement.



Maintain all machine PTO Guards



Case studies:

1. A farmer was working near the pump unit of a slurry tanker. On stepping over the partially unguarded PTO shaft his right trouser leg became entangled in the revolving PTO, resulting in his leg being amputated.
2. A farmer was working close to an unguarded PTO shaft attached to a diet feeder and became entangled in the shaft. The farmer lost one leg and badly damaged his other leg.
3. A farmer was agitating a slurry lagoon with a slurry agitator; the PTO shaft was partially uncovered. He became entangled and lost his leg.
4. A farmer opened an inspection hatch on the side of a diet feeder to check an unusual noise, his arm was drawn in and was amputated.



Key points:

- Proper installation, regular maintenance and careful operation will ensure that PTO guards will last longer
- Check the guards on a regular basis for damage and wear
- Always replace damaged guards without delay as even slightly cracked or damaged guards can pose a risk of entanglement
- Keep a sufficient stock of spares to minimise down time
- Make sure that the guard is the correct length and size for the shaft
- Make sure the restraining devices are in place and are working correctly to prevent the rotation of the shaft guard
- Always refer to the manufacturer's guidelines on the correct fitting and maintenance of the PTO guards
- Check that no person is in the danger area, before you engage the PTO drive

Greatest PTO risk is associated with vacuum tankers & grain rollers



- When driving never turn too sharply as the tractor's lower links or tyres can damage the PTO shaft
- Do not wear loose clothing when operating machinery
- When the machine is not in use you should support the drive shaft and guard to protect from damage
- PTO guards do not last forever, so replace them immediately where necessary

The PTO is one of the oldest and most deadly hazards associated with the use of farm machinery. However the risk of injury can be reduced to zero if properly guarded!



Check that the U Guard is in place



11 Safety when operating on public roads

Tractors and machinery are much larger and heavier than the average car.

Therefore any collision with a car at speed is highly likely to result in serious injuries. In addition, most rural roads are narrow, often winding and with uneven surfaces. Tractor drivers must always drive giving consideration to other road users and the road conditions. For instance, it is unacceptable to drive through a town at full speed with fully laden trailer where there would be little hope of stopping if someone stepped or reversed out in front.

All tractors used in a public place are subject to the laws governing road traffic. These include the tractor driver licensing, insurance, motor tax, vehicle lighting and road worthiness.



Don't place other road users at risk

See **Appendix 10 – The rules of the road and agricultural vehicles.**

It is now common to have fully loaded tractors and trailers with a capacity to travel at speeds in excess of 60 Kph. In this scenario trailers need effective braking, lighting & visibility, and suspension systems; and all tyres must be in good condition. From 1st Jan 2016 such trailers will also require fitment of both a national weights and dimensions plate and speed disc. See Appendices 3 and 10 for further details.

Regular maintenance is essential for all tractors but particularly for tractors that operate on public roads. Good maintenance will ensure that mechanical faults are detected and corrected before it could lead to an accident.

Always pay particular attention to overhead power lines and obstructions such as bridges and trees while travelling on public roads.

11.1 You must have the class W driving license

The W class license enables you to legally drive a tractor on the road, from age 16 years. The minimum age at which you can apply for a category W licence is 16 years. Anyone who has passed the 'Learners Driving Test' automatically qualifies for a Class W driving license.

11 Safety when operating on public roads



If you obtained your driving license before the 'Learners Driving Test' was introduced then you may not have a license for tractors and machinery on roads. If you are not licensed then driving is illegal and your insurance cover may not be valid in the event of an accident.

11.2 Entering or exiting the road

You must ensure the road is clear before going onto or crossing a public road. Bear in mind that traffic coming around a corner at 100 km/hr. is moving at 28 m/sec.



To stay safe on the public road;

- Keep driveways and access onto public roads clear of vegetation and overhanging trees, so that you can see and be seen
- Locate farm entrances on straight sections of roads, where possible
- Keep as visible as possible by going onto roads with your 'dipped headlights' and 'orange hazard beacon' switched on
- Clearly signal if you are leaving the road to turn into a gateway. Pull as far to the left as possible before turning in. Where possible, don't pull over the centre of the road in order to turn left into a gateway
- Try to avoid going onto public roads when traffic volume is high. This may be from 7.30 to 9.30am, a period in mid-afternoon and again from 5.00 to 6.30pm
- If the tractor or machine is regularly turning onto a road then a warning sign "Tractor Entering" placed about 150 m back will give notice of impending danger
- This is appropriate during grain or silage harvesting or when spreading slurry. Remember to take the sign down once the work is complete

Connect trailer brakes before leaving the farm yard

11.3 Operating tractors and machinery on motorways

Any vehicle on a motorway must be capable of travelling at 50 km/hr or more. Some tractors can operate at speeds of up to 80km/hr but most cannot and as a general rule farm tractors and machinery should not be driven on motorways as they create a serious hazard to other road users due to their slow speed. Always ensure that the tractor and or implement are very well lit when travelling at night-time.



11.4 Watch for following traffic

If traffic builds up behind you over a long distance other drivers will become frustrated and some will attempt to pass in unsafe places. Always be aware of such traffic build up and if there is a line of cars behind you or where one has been trailing you for 5 minutes or more, when possible find a safe place to pull over and let traffic by. This is simply applying common courtesy to other road users.

11.5 Over-size loads on roads

The key factor is your visibility to other road users. Common sense applies. For instance, if you are driving a combine harvester on a narrow road where there is not enough room for both vehicles to pass, then have another vehicle in front with a “Wide Load Following” sign and avoid the busy times, where practicable. Always drive cautiously, with dipped head lights and the orange hazard beacon(s) flashing.

To move agricultural machinery safely on the public road;

- Tractors must be less than 2.5 m wide. The overall width of a large tractor may exceed 2.5 metres but must not exceed 2.75 metres
- The maximum width of a tractor and trailer together is 2.9 metres except for “loose agricultural” produce
- Any vehicle extremity, including bale spikes, should be visible to any person from a reasonable distance and should be protected to prevent injury to any person
- Avoid driving with an oversize load at night or where there is limited visibility such as in dense fog
- To ensure the stability of tractor and trailer combinations while travelling on the road it is essential that loads are evenly distributed and are drawn using appropriately sized tractor and trailer combinations, with the correct braking systems fitted and working
- Never exceed the maximum permitted weight limits for vehicles and axles set down in Road Traffic Regulations³ and the manufacturers maximum ‘Design Laden Weight’ for the vehicle concerned
- Trailers should not be overloaded and tractor and trailer combinations should also travel at speeds appropriate to agricultural vehicles



- Overloading can affect the stability, steering and braking capability of the tractor and trailer



11.6 Muck on the road

There are serious liability issues if muck on the road causes a motorist to lose control of their vehicle. It is very hard to avoid some road contamination when harvesting and loading crops such as potatoes, particularly in wet conditions. Take precautions when cleaning away muck to remove the hazards associated with this activity.

Section 13 of the Roads Act 1993 states that it is an offence to allow stones, clay or any other material to remain on a public road where doing so would cause a hazard or potential hazard to people using the road and obstruct or interfere with the safe use of the road.

If you are causing muck on the roads it is essential that warning signs, stating 'Muck on Road' be placed in a safe place.

This is the legal duty to warn of an impending hazard.

Take steps to ensure that loads on tractors or trailers are well secured to prevent material falling onto the public road, such as potatoes, grain, etc.

Drivers should try to ensure that the tyres of vehicles are regularly washed down to avoid carrying mud and stones onto the public road.

11.7 Lighting

Tractors used in public places must be fitted with two head lamps, two side lamps, two tail lamps, two rear reflectors, direction indicators, brake lights and number plate lighting. Trailers must also have adequate lighting and reflectors. Detached trailers parked in a public place after dark must be fitted with two side lamps, two rear lamps and two rear reflectors.



12 Operating safely on hills and slopes

Most accidents on hills occur because of a lack of traction leading to a total loss of control. Once a tractor, machine or Quad starts to slide or overturn there is little you can do about it other than steering with it and attempt to regain the control. In essence it is often too late to do much except try to hold on.

If you lose control on a hill your survival chances are best by staying with the machine. Trying to jump out will most likely result in you being crushed, always use your discretion. Safety cabs should be in good condition with both doors securely closed when driving.

Most new tractors and 4 wheel drive tractors have inherently better traction than their 2 wheel drive predecessors. But they are only safer if the 4 wheel drive function is engaged.

Key factors to consider:

- The gradient of the slope?
- The evenness of the surface?
- The task – why are you there?
- The soil type – clay or sandy soils?
- Total weight?
- Quality of traction – type & depth of tread on the tyres?
- Number and quality of the wheel brakes?
- Your initial speed?
- Your experience and competence as a driver in such conditions?



12.1 Speed as a control and stability factor

The combination of lurching, from the often uneven surfaces, and speed are the main factors that lead to a loss of control. Low gears and low speeds are much safer than high gears or going fast. This is even more critical if the surface is wet or slippery.



12.2 Centre of gravity as a stability factor

Hitch as low as possible, keep the front end loader right down to lower the Centre of Gravity of the machine.

When travelling along the side of a slope experienced drivers learn to drive with the front wheels slightly uphill where in effect the tractor is 'crabbing' along. This can be done by lightly touching the uphill brake pedal.

12.3 Turning on slopes

Always avoid making sharp turns on slopes. Instead make a slight change of direction to make the turning radius much greater. This minimises the chances of tipping over.

On mild slopes when you may be going faster, it is safest to turn downhill. But when on a steep slope driving at slower speeds it is safest to turn uphill.

12.4 Number and quality of the wheel brakes

Braking on all wheels is better than on just the rear tractor wheels. The brakes must be applied gently when going downhill, if at all. It is better to select a low enough gear at the top and let the engine braking do most of the work. The ABS Braking and Traction Control systems on some modern tractors are usually far superior to any manual control by the driver in an 'out of control' situation.

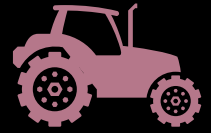
Don't drive on steep hills with un-braked trailers. It is important that the trailer brakes are working evenly and are synchronised with the tractor brakes.

12.5 Adequate roll over protection

Roll over protection has been mandatory on tractors for many years. There are no circumstances where a tractor should be used on a slope without a cab. In addition all new tractors have lap seat belts. In the event of a roll-over these will stop you from being thrown around the cab or out of the tractor. Lap seat belts should always be used.

Particular care is required in the following situations:

- Turning with rear mounted equipment on a slope
- Driving near a ditch or bank or over uneven ground with hidden obstacles
- Using a tractor to consolidate silage in the pit



12.6 Safe driving on slopes

Always check the ground you are going to drive over. A gentle slope can become unsafe after heavy rain.

Key points:

- Know your tractor – Are brakes operating fully?
- Set wheels to widest width
- Always connect trailer brakes
- Plan the Work
- Keep an eye on ground conditions as you work
- Remember – no slope is totally safe
- Inexperienced drivers should not work on slopes





13 Maintenance as a safety factor

Maintenance occurs on many levels, starting with planned or scheduled maintenance based on time intervals or machine hours worked, through to stopping a job when you hear or see something unusual and you stop to check it out. There must be no situation where an injury occurs because the required maintenance has not been done.

The law says that you must maintain all work equipment, in a safe condition for use, so that the operator's health and safety is not at risk.

There are some basic rules that apply to all maintenance work:

- You must be competent to do the maintenance – either by training or experience
- Only carry out the work if you are capable of doing it safely
- If in doubt about what to do consult the operating manual. (Nearly every contingency is covered)
- Plan the work and identify any risks involved
- You must have the appropriate tools for the work
- You must follow a safe system for doing the work
- All propped machinery must be properly supported
- Replace all the guards before restarting the machine

Many serious and fatal accidents have occurred while carrying out maintenance on machinery. In many cases the machine is partly dismantled and often not adequately supported or stabilised. Being competent to carry out the work involved, applying hand brakes and using proper sturdy supports and chocks are essential during maintenance work.

13.1 Clearing a blockage

If you stop in the field to clear a blockage or to check an unusual noise **always** shut the machine down and let all moving parts come to a complete stop before removing any guards. This is the **“Safe Stop” Procedure**.

Many serious and fatal accidents have occurred while clearing a blockage. In many cases the machine operator attempted to clear the blockage while the machine was still running. Never attempt to clear a blockage with the machinery running and even when stopped don't clear blockages with your boots or arms; instead use a bar or a stick as there may be some stored energy that might trap you.



Before commencing such work, ask yourself the following question. **Am I competent to unblock the machine safely?** If you are unsure, contact the manufacturer/distributor or seek help from a trained, competent person to carry out the work in a safe manner.



13.2 'Jump Starting' a tractor or self propelled machine

Read and understand all safety symbols & warnings!

Before 'Jump Starting' a tractor or any other self-propelled machine from an external source, **the machine must be out of gear**, the handbrake on and the ignition key out when the terminal leads are connected. Once the leads are connected then put in the keys and restart it from the driver's seat..

Never bypass the safety features when starting a tractor.

13.3 The daily check – before you start work

A daily check should be made before use of any machine. For a tractor this will include cleaning the windows and mirrors, a visual tyre check, cleaning the steps of any muck, checking the fuel, oil and coolant levels, topping-up the windscreen washer fluid, checking for oil leaks, ensuring the radiators are clear of straw or chaff and greasing any grease points. Generally, this will take no more than **5 minutes** and may save you from having a lengthy breakdown.

Identifying a tyre that needs air can prevent a serious overturn or cleaning windows and mirrors may prevent a serious collision, so do make time to do a five minute check before using any machine.

13.4 Scheduled maintenance

The manufacturer will always provide a maintenance schedule based either on the hours of use or the elapsed time since the previous service. The basic service may be oil and filter change, check of the brakes, check of the hydraulic hoses, check the lights and check tyres for wear, damage and pressure. If you are not competent to do the required maintenance then leave the job to someone who is.



During maintenance work;

- Never go under a raised implement or loader that is solely supported by the hydraulics. Always prop it. Use an axle stand or any material strong enough to support the weight, should the hydraulic valves fail. (There have been several tragic accidents where inadequately propped equipment fell and crushed the victim)
- Where you need to remove a guard to inspect or repair an item it must be reinstated before work commences again
- The machine must be immobilised by applying the handbrake (or equivalent) and chocking the wheels
- If you need to run the engine then the machine must be out of gear and the handbrake on
- Before starting any machine you must also know how to stop it

Farmers use and maintain a very wide range of machinery and equipment. No one should attempt any machinery maintenance tasks unless they are competent to do the work. Some machinery is now so specialised that maintenance can only be done by a serviceman. This is particularly so where machines have electronic control units.

13.5 Leaking or damaged hydraulic hoses

The hydraulic system transfers energy that builds up in the fluids under pressure. The pressure in hydraulic hoses can be as much as 2,500 pounds per square inch (psi). Care must be taken because very small holes or leaks in hydraulic hoses can send out powerful jets of fluid that can penetrate the skin.

Hydraulic hoses work at immensely high pressures and the tiniest 'pin-prick' leak can result in the hydraulic oil being injected through the skin on contact. This may result in the loss of a finger, the hand, an arm or sometimes death. If checking for suspected leaks wear Nitrile rubber gloves and check for leaks using a sheet of paper.

When working on hydraulics;

- Always wear Nitrile rubber gloves when working near hydraulic hoses
- Replace damaged hydraulic hoses immediately
- Replace all hydraulic hoses as per the manufacturer's recommendations
- All hoses have a maximum bend radius – do not exceed
- Ensure the correct size and correct pressure of hose is used

13 Maintenance as a safety factor



- Make sure that the hose is fitted correctly before starting the job.
- When fitting the hose make sure the surfaces are clean

The injection of hydraulic oil under the skin requires immediate medical treatment. Immediately seek help from your GP or an Accident and Emergency Department.

Never go underneath any hydraulically raised implement without first propping it in case the hydraulics fail. Never rely on the hydraulics alone, even for a short period of time.

If you suspect you have been struck by a jet of hydraulic oil - Do not wait until the symptoms appear.



Wear nitrile gloves and watch out for pressure leaks

13.6 A safe and tidy workshop

Modern farming requires regular servicing and repairs to farm machinery. Many farms have a workshop with tools and equipment to carry out this work. The scale and nature of the farm workshop varies from farm to farm. It is important to remember that safe work practices must be in place for all work, particularly maintenance work.



Keep your workshop clean and tidy for safe working



Slips, trips and falls

- Slips, Trips and falls are a major source of injuries on farms
- Keep the workshop tidy at all times
- Avoid tripping hazards such as tools on the ground or trailing cables
- Bin parts packaging particularly plastic which can be slippery underfoot
- Bin damaged bolts, bar or metal cut offs to keep ground clear
- Provide a metal bin for rubbish
- The workshop must have adequate shelving for storage
- Equipment should have designated storage areas

Safe lifting of heavy items

- Heavy items should be lifted mechanically wherever possible
- Lifting equipment should always be checked before use
- Minimise heavy manual lifting
- Use proper lifting techniques
- Wear appropriate clothing allowing load to be held close
- Check route and set down area is clear before lifting
- Avoid twisting the back while handling loads. Turn your feet in the direction of your movement
- Protect your toes with steel toe capped boots and your hands with gloves
- Get help if needed

Oil spills

- Oil spills create slippery surfaces and are also a fire hazard
- Prevent oil spills and clean up spillages immediately

Adequate and tidy storage

- A cluttered workshop is inefficient
- It is hard to find things, there is not enough room to do the work and there are numerous tripping hazards



A safe pit

- A pit is very useful for getting under the tractor or a machine
- The steps into the pit must not be slippery
- The pit must not be left open after use. Always replace the cover so that no-one can fall into the pit

Handling oil drums

- 220 litre oil or grease drums are extremely heavy and wherever possible should be handled mechanically
- Specialised drum trolleys are available

Waste oil disposal

- Waste oil is a fire risk. Oils are a major pollutant if allowed to seep into the ground
- Waste oil should be disposed of properly at a recycling facility
- Have secure containers to hold the waste oil

Fuel storage

- Diesel tanks should be banded
- There must be no smoking or other sources of ignition in a fuel storage area
- Provide proper access for deliveries or to check levels
- Keep the area clean



Using grinders and drills

- Only use abrasive wheels and discs for the intended purpose. Always match disc speed to grinder speed
- Only work with the leading edge of the wheel or disc
- Discard 'out of date' wheels or discs
- Discard damaged wheels or discs
- Discard wheels or discs that have come into contact with oils or water
- Safety glasses complying with EN166 class B must be worn. Also hearing protection must be worn during extended use
- All sockets in the workshop must be protected by a 30mA RCD (Residual Current Device)
- The power lead must be free of damage
- Never force the wheels or discs. Let them heat up gently and then apply even but not excessive pressure
- All of the machine guards must be properly fitted and clean

Safe welding

- Gas bottles must be stored in an upright position on a trolley
- Welders must have a secure and adequate power supply
- When welding there must be adequate ventilation to take away metal fumes
- The welder and any helpers must have the required clothing and PPE
- Welding requires skill. Training courses are available. The welder must be competent and understand the nature and hazards of the work



Lifting equipment

- Fixed lifting equipment must be tested as part of a thorough examination before being used for the first time
- All lifting equipment must be tested after any substantial alteration or repair affecting its strength or stability

Air circulation

- Where engines are running inside a building, as on a tractor or self-propelled harvester there must be a means of ensuring the fumes particularly carbon monoxide do not build up
- Ensure the workshop is well ventilated to allow fumes to disperse or install a fume extraction system

Fire extinguishers

- Fires are usually only controllable within minutes of their starting
- All workshops should have Fire extinguishers in place
- Fire extinguishers should be hung at the entrance and be easily accessible
- Fire extinguishers should be checked annually

Compressed air

- Air compressors can explode if not correctly maintained
- A compressor should be examined by a competent person in accordance with the manufacturer's recommendations or at least every 24 months
- If there is an external belt drive for the compressor it must be fully guarded at all times
- Use safety glasses when using compressed air to remove debris from a machine
- Tanks should be regularly drained of water to avoid corrosion



<p>Rat infestation</p>	<p>Adequate lighting</p>
<ul style="list-style-type: none"> • Rats are a health risk in carrying disease and also they will chew power cables • Always lay baits around the workshop in the autumn period and keep up the baiting as long as the baits are being eaten 	<ul style="list-style-type: none"> • Lighting must be bright enough to give you good vision of the task in hand • Light covers must be regularly cleaned • Extension lead lights must be double insulated, the bulb protected and the leads in good condition
<p>Clothing and PPE</p>	<p>Children</p>
<ul style="list-style-type: none"> • Steel toe cap boots should be worn • Avoid loose clothes and wearing jewellery that can get caught in machinery • Long hair should be tied back or secured in a cap/hair net 	<ul style="list-style-type: none"> • The workshop is not a safe place for children • Keep children out of the workshop when work is being carried on • Children must not be allowed into a workshop without adult supervision

13.7 Inflating tyres/Changing wheels

Removal, replacement and inflation of tyres is an extremely common practice in many work sectors in Ireland, so it may seem a simple task. But it can cause injury and even death resulting from:

- explosion of the tyre or disintegration of the wheel during inflation,
- children or elderly being crushed under large wheels,
- manual handling of the tyre and wheel, and
- collapse of an elevated vehicle.



It is strongly advised that, where reasonably practicable, the removal, replacement and inflation of tyres on agricultural machinery be carried out by a professional tyre fitting contractor.

Ensure that a suitable jacking point is identified for the tractor or farm vehicle. You should refer to the manufacturer's manual for this information.

Inflated tyres contain a large amount of stored energy, but if they are damaged or used while flat, or significantly underinflated, they may fail.

The explosive force can then be released at an angle of up to 45 degrees from the rupture (which is often, but not always, the face of the sidewall). This can result in a destructive air blast and the ejection of high-speed particles. If the wheel is not restrained, it can fly several metres through the air.

Similarly, failure of multi-piece ('split rim') wheels can result in explosive ejection of component parts.

These types of tyre explosion have led to numerous deaths at work.

To reduce the risk of violent explosion:

- Before deflating a tyre, check the pressure and chalk the reading on the tyre wall.
Note: low tyre pressure may have caused tyre wall damage
- Do not inflate any tyre that has been significantly underinflated until it has been adequately checked
- Examine wheels and tyres (externally and internally) for signs of damage, such as;
 - o cracks,
 - o marbling (black lines),
 - o bulging,
 - o soft spots, or
 - o exposed steel cord in the tyre carcass.
- If in doubt DO NOT re-inflate the tyre
- Stay outside the likely explosion trajectory, when re-inflating a tyre
- Watch and listen for signs that might indicate zipper failure
- If you suspect a problem, do not approach the tyre to deflate it – use the quick-release connection at the operator's end of the hose



DOs and DON'Ts for all tyre inflation

DO	DON'T
Use a clip-on chuck to connect the airline with a quick-release coupling at the operator's end (this allows tyre deflation from a safe position if problems occur)	Use valve connectors that require the operator to hold them in place
Use airline hoses long enough to allow the operator to stay outside the likely explosion trajectory during inflation	Exceed the manufacturer's recommended tyre pressure for the size and rating of the tyre
Use enough bead lubricant when seating the tyre. Consider removing the valve core or using a 'beadblaster' if seating is difficult	Use 'unrestricted' airlines (i.e. without a pressure gauge)
Remove the airline after use to prevent air seepage and over-inflation	Allow the control valve to be jammed open (which could allow the operator to leave the inflating tyre unattended)

Extra safety measures are needed for inflating larger tyres above 15 psi. Some tyres on large machinery may be inflated up to 70 psi and may cause serious injury in the event of failure.

The extra measures include using a restraining device such as:

- A strong, firmly secured tyre inflation cage. Consider lining this with mesh to retain debris. For fixed installations it is helpful to mark the safety exclusion zone on the workshop floor as a reminder to others
- A secured horizontal stool and associated clamping mechanism
- A portable restraint, such as a lightweight cover that encloses the tyre and wheel rim. This may be particularly useful for off-site repairs.

13 Maintenance as a safety factor



In the event of an explosion the fabric contains projected debris. Fabric devices may need to be replaced after an explosion.

It may not be reasonably practicable to provide purpose-built cages of adequate strength, particularly for work outside of the workshop. In such cases it is critical that persons are made aware of and not allowed to stand in the danger zone.

Restraint during tyre inflation is usually achieved by mounting on the wheel hub of the vehicle. Use a protective barrier, such as a wall, embankment or the side of another vehicle, to restrain flying objects ejected during a failure. It is essential that people only work in a safe position out of the danger zone.





14 Buying machinery

Buying new machinery is a significant investment decision affecting the farm business over a long period of time. It is important to fully consider your machinery needs and safety in relation to this decision.

The Machinery Directive requires that all new machinery must have a Declaration of Conformity and a CE mark on the machine.

Purchasing sub-standard machinery increases the risk of a serious accident.



Check that the machine has a CE Mark plate attached





15 Training as a safety factor

Training on the proper use of machinery is essential and should emphasise the need for care and concentration when working with tractors and machinery. The operator's handbook gives a comprehensive guide to machine operation. Use the handbook to be totally familiar with the operation and maintenance of the tractors and machinery on your farm.

All employers are required to ensure that employees are adequately trained and competent to use tractors and machinery. Competence means being able to safely complete a task without supervision.

Teagasc, www.teagasc.ie, FRS Network www.frstraining.com, FTMTA www.ftmta.ie and others run courses focusing on the safe and efficient operation of tractors and farm machinery.





16 Further reading

1. Managing Risks from Vehicles at Work (HSA), http://www.hsa.ie/eng/Vehicles_at_Work/
2. Health and Safety Executive (UK) Website
<http://www.hse.gov.uk/agriculture/topics/machinery/index.htm>
3. Guide to application of the Machinery Directive 2006/42/EC 2nd Edition – June 2010
http://ec.europa.eu/enterprise/sectors/mechanical/files/machinery/guide_application_directive_2006-42-ec-2nd_edit_6-2010_en.pdf
4. Road Safety Authority (RSA) Website www.rsa.ie
<http://www.rsa.ie/en/RSA/Your-Vehicle/Vehicle-Standards/Agricultural-Vehicles/>
SI 5 of 2003 - Road Traffic (Construction & Use of Vehicles) Regulations.
5. SI 253 of 2014 - Road Traffic (Construction & Use of Vehicles) (Amendment) (No 2) Regulations 2014 (Weights and Coupling)
6. SI 248 of 2014 - Road Traffic (Construction, Equipment and Use of Vehicles) (Amendment) Regulations 2014
7. SI 249 of 2014 - Road Traffic (Lighting of Vehicles) (Amendment) Regulations 2014
8. SI 247 of 2014 - Road Traffic (Plating and Speed Rating of Agricultural Vehicles) Regulations 2014
9. SI 147 of 2009- Road Traffic (Specialised Vehicle Permits) Regulations.
10. Tractor Safety and You – HSA (2010) (http://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Tractor_Safety_and_You.html)
11. Essential Tractor Safety Checks (http://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Essential_Tractor_Safety_Checks.html)
12. Agriculture Code of Practice www.hsa.ie
13. ACC Bulletin 404, 2002 www.acc.co.nz
14. Health and Safety Executive (Northern Ireland) Website <http://www.hseni.gov.uk/>





















Appendix 1 – Tractor safety

Accidents with tractors

The main causes of accidents when driving tractors are:

1. Driver human error.
2. Carrying passengers without suitable seating.
3. Driver unfamiliar with the controls.
4. Tractor lacking adequate safety features.
5. Poor maintenance (brakes and handbrake not working).

Tractors - Key safety points

-  Always carry out a visual all round check before getting on the tractor
-  Carry out daily checks which includes oil, water, diesel, tyres and lights
-  A cab or safety frame to OECD standards must be fitted
-  Look for corrosion on frames of older tractors
-  Always ensure that the tractor can be started with the key and that the engine-stop control is effective
-  Check the mirrors and windows for clear visibility and keep them clean
-  Use the **SAFE STOP Procedure**
-  The vehicle controls should all be in working order and clearly marked
-  Ensure that the cab floor is kept tidy to allow safe use of brakes and clutch
-  The brakes and hydraulics should be in good working order
-  A properly functioning handbrake is essential
-  Ensure that the power take-off (PTO) can be turned on and off correctly, and that the PTO shield (U guard) is kept in place at all times
-  Adjust the seat to suit the driver
-  The hitch points of both tractor and trailer must not be worn
-  Do not leave the tractor seat while the engine is running
-  Always start the tractor from the driver's seat
-  Take care when mounting and dismounting the tractor
-  Do not stand between the tractor and other machines



- △ The tractor must comply with all road traffic legislation
- △ Drivers must always be aware of the dangers that tractors pose to vulnerable road user groups such as pedestrians, cyclists, motorcyclists, children and the elderly
- △ Establish one way systems where possible to minimise reversing manoeuvres
- △ When parking, reverse park if safe to do so making sure all persons are clear particularly young children and elderly

The Health and Safety Authority has produced a useful publication 'Essential tractor Safety Checks'. Available from

http://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Essential_Tractor_Safety_Checks.html.



Tractor safety checks should cover the following areas:

- initial checks,
- in cab checks,
- driver competency,
- windscreen and side windows,
- mirrors,
- lights and indicators,
- tyres and wheels,
- external checks,
- safe parking, and
- passengers.



Driving the tractor

- Always adhere to the speed limits in public places
- Take particular care when reversing tractors and trailers; use a second person to direct you if possible
- Consider fitting a reversing camera
- Take care when driving on sloping, hilly ground
- Never carry passengers or children on tractors unless there is a passenger seat with a seat belt fitted
- Children under 7 years must not be carried on the tractor
- Do not handle hydraulic pipes when the engine is running. Oil under high pressure can penetrate the skin and cause serious injury
- Turn off ploughing lamps when travelling on the public road
- Always adjust your driving to suit the conditions or situation involved



Consider ground and slope conditions



Be alert to your surroundings at all times

Driver awareness is crucial for safety.



Training

Modern tractors use sophisticated technology – operators need to be trained.

Safe tractor driving training should cover:

- operation of all controls
- controlling speed
- driving on slopes
- towing equipment
- use of brakes
- safe parking
- hitching and unhitching
- effects of ground conditions and wheel grip
- safe stop procedure, and
- good maintenance and safe working practices.

Training courses are available for young people, for example, FRS Training run a course on Safe Tractor Skills for 14-16 year olds.

Tractor braking

Tractors, trailers and other farm machinery must have brakes designed for the maximum loads and speeds at which they will operate.

- ✓ Always check that the brake pedals are coupled together.
- ✓ Check the tyre treads and tyre walls for damage or wear.
- ✓ Check that tyre pressures are correct.
- ✓ Keep weight evenly distributed.
- ✓ Check that the brakes are balanced.
- ✓ Check the handbrake.
- ✓ Keep the pedals free from obstructions.



Check brakes before use



Roll over protection

The main factors affecting the stability of a tractor are the nature of lateral and longitudinal slopes, the speed you are travelling, the unevenness of the surfaces, the tread type and tyre pressure on the tractor tyres.

Only operate tractors with a roll bar or safety cab fitted.

All new tractors have lap seat belts. In the event of a roll-over these will stop you from being thrown around the cab or out of the tractor. Lap seat belts should always be used where provided and particularly where there is a risk of overturning. The risk of overturning is greatest when travelling at speed or when travelling on sloping uneven ground.



Control speed on sloping ground



Check for excessive wear on hitches

Safe hitching/unhitching

There is always a risk of an accident when hitching and unhitching implements from the tractor.

Remember to:

- use the correct hitch system,
- pick-up hitches and trailer eyes should be free from excessive wear that may result in unhitching, especially when tipping loads,
- watch out for wear on both the hook of the tractor and the towing eye of the trailer,



- take care with telescopic (push back) hitches,
- retract the hitch before moving off with a load, and
- take care when drawing high loads close to overhead power lines.



Watch for Overhead Power Lines

Maintenance work on tractors

Servicing

It is essential that tractors are serviced at the recommended intervals according to the manufacturer's manual. Repairs to critical items such as brakes and handbrakes should be carried out by a competent mechanic.

Inflating tyres/Changing wheels

Removal, replacement and inflation of tyres is an extremely common practice on tractors, so it may seem a simple task.

But it can cause injury and even death resulting from;

- explosion of the tyre or disintegration of the wheel during inflation,
- manual handling of the tyre and wheel, and
- collapse of an elevated vehicle.

Ensure that a suitable jacking point is identified for the tractor or trailer. You should refer to the manufacturer's manual for this information Refer to section 13.7 for more information on this area.

It is strongly advised that, where reasonably practicable, the removal, replacement and inflation of tyres on agricultural machinery be carried out by a professional tyre-fitting contractor.



Case studies – Tractors

- A farmer was run over and killed as he tried to mount a runaway tractor. The hand brake on the tractor failed, causing the tractor to run away down a slope. The farmer tried to mount the tractor but fell under the wheels receiving crush injuries to the head and chest
- An elderly farmer was killed when he was attempting to start his tractor from outside the cab. He was standing at the front of the tractor close to the engine. Apparently, the tractor was in gear and moved forward and crushed the farmer
- A 61 year old farmer was standing between the rear of the tractor and the transport box. When he reached into the cab and raised the lever to lift the transport box he became trapped and died as a result
- A 70 year old farmer was operating a tractor on hilly ground when the tractor overturned. He was thrown clear of the vehicle and sustaining head injuries. He died in hospital on the following day
- A farmer was adjusting the lifting arm on a tractor which had a slurry agitator attached. The agitator became unstable and moved. The farmer was found dead at the scene. His body was crushed between the rear wheel of the tractor and the agitator



Check brakes before use



Appendix 2 –Quad bikes (ATV's)

Quad Bikes often known as Sit-astride all-terrain vehicles (ATVs) have become very popular on farms in recent years. They are useful machines, however they have been involved in many serious and fatal farm accidents.



Most accidents with Quads are caused by:

Check tyre pressure & brakes before use

- excessive speed,
- overturning on steep slopes or rough terrain,
- towing excessive or awkward loads,
- driver is lacking in training or experience, and
- carrying passengers.

Head injuries or being crushed under the Quad are the most common cause of death. It is essential that anyone riding a Quad wears a suitable helmet and is trained to drive safely.

The most important safety issues are:

- Operator training
- Wearing personal protective equipment
- Correct maintenance
- A good knowledge of the terrain
- Not carrying passengers

Professional training is vital.

The employer must provide suitable training and ensure that Quads are only used by employees/workers who have received appropriate training in their safe use, including the use of any towed equipment or attachments.



Personal Protective Equipment

More than half of all Quad riders have been thrown off at some time. There is no cab or roll bar, so your only protection is what you wear.

Head protection is vital. A high percentage of serious injuries with Quads involve head injuries. At present a motorcycle helmet to BS 6658: is recommended, but other helmets or head protection which meet EN1384:1997 are also acceptable.



Typical Quad helmet

Wear clothing which is strong and covers your arms and legs. Gloves are useful for protection and to keep hands warm in cold weather for good control of the Quad.

- Wear boots or Wellingtons which are strong and have good grips (Complying with EN345-1)
- Protect your eyes from insects and branches with either a visor or safety goggles (Complying with EN 166)
- High visibility clothing may also be appropriate
- **NEVER** carry a passenger on a sit-astride Quad. The long seat is for operators to shift their body weight backwards and forwards for different slope conditions **NOT** for carrying passengers
- You should not carry a passenger in a trailer behind a Quad, as any movement will make the machine unstable
- Off-road riding is especially hard on a Quad so it is essential to carry out maintenance according to the manufacturer's recommendations



Safety checks

Check in particular:

Tyre pressures: check daily as only 1-psi (0.07 kg/cm²) difference in tyre pressure can cause vehicle control problems. Use a gauge that is designed for measuring and displaying low pressures - usually supplied with your Quad.

Brakes and throttle: check that the brakes give a safe straight stop and that the throttle operates smoothly in all steering positions. Brakes other than disc brakes can have a relatively short life in farm or forestry conditions, unless regularly and effectively maintained.



Driving a Quad

The following advice is no substitute for formal training.

Quad should be suitable for the person and the work involved

Most Quads have no differential (i.e. they have a solid rear axle) and so do not handle in the same way as other machines. This means that when you turn, the Quad tries to keep going in a straight line.

When cornering on a Quad with no differential or with the differential engaged, where your body weight needs to be positioned depends on how sharp the corner is and on how fast you are going. For slow cornering you should put your body weight on the footrest on the outside of the turn while leaning your upper body into the turn. This will allow the inside driving wheel to skid slightly, allowing the Quad to make the turn properly.

At faster turning speeds the need for weight transfer to the outside of the turn decreases.

If your Quad has a differential and it is disengaged, then, when cornering, weight should be transferred to the inside of the turn.



When riding across a slope, keep your weight on the uphill side of the Quad;



When going downhill, slide your weight backwards and select a low gear reducing the need to use the brakes.



When going uphill, move your weight forwards and maintain a steady speed.

Note: The positions described above can be made more effective for rough ground and higher speeds by standing in a stooped position (called active riding). This increases the ability to shift weight quickly and maintain stability. It is important to keep both feet on the footrests at all times.

Avoid sudden increases in speed, as this is a common cause of rearward overturning accidents, even from a standing start on flat ground where there is good grip.

Never put your foot onto the ground to stabilise a Quad when riding.



Route planning

Over rough terrain get to know the ground and stick to planned routes where possible. Walk new routes if necessary to check for hidden obstructions such as rocks or tree stumps.

When selecting routes, allow for changes in the surface, in weather conditions and for effects of any loads & attachments.

Trailed equipment and loads on quads

Ensure all riders know the manufacturers recommended towing capacity and drawbar loading limit. Always operate within these limits.

Remember that your ability to control the Quad by your body movements will be considerably reduced when carrying a load or towing a trailer.

When selecting **trailed equipment** look for:

- over run brakes,
- swivel hitch drawbar,
- bead lock rims on wheels,
- a low centre of gravity and a wide wheel track,
- a long drawbar, and
- attachment points for securing a load.

Check the weight ratio between your Quad and its trailed load. This needs to be assessed for each operation.

As a general guide, on level ground braked trailed equipment can be a maximum of four times the un-laden weight of the Quad. For un-braked trailed equipment the maximum should be twice the un-laden weight. These loads should be reduced when working on slopes, uneven ground or poor surface conditions.

Follow the manufacturer's advice for your particular machine.

Weight transfer is also important. Stability and resistance to jack knifing is improved if some load is transferred onto the Quad's drawbar. Approximately 10% of the gross weight of the loaded trailer is recommended, but this should not exceed the manufacturer's drawbar loading limit.

Remember that weight transfer can change dramatically when you start going uphill or downhill.



When selecting mounted equipment, make sure it is within the manufacturer's approved weight limit, with a low centre of gravity, and controls which are easy to operate but do not create a hazard. Where equipment is added to one end of the machine, add ballast at the other end to maintain stability.

Loads carried on racks must be well secured, e.g. with ratchet straps, and be evenly balanced between the front and rear, except where they are deliberately altered to aid stability when going up or down a slope.

Only tow a load from the hitch point. Loads towed from other points such as the rear rack have caused sudden rear overturning even on slight slopes or with slight acceleration.

Ropes or chains should not be used to drag a load where they can become caught on a wheel. This may lead to entanglement with the brake cable, causing unexpected braking.

Using sprayers

You are more likely to be exposed to spray drift on a Quad than on a tractor with a cab, so a tractor should be used whenever possible. Where a Quad is used, then attention to safety features is especially important when buying a sprayer and when spraying, particularly with mounted sprayers where the boom is close to you and contamination more likely.

Consider techniques and equipment which contain spray within the target area and reduce drift potential, such as a drift hood or canopy, low drift nozzles etc.

When buying a sprayer look for a low centre of gravity and internal baffles to reduce liquid surge which will improve Quad stability when turning on slopes. Consider the distance of the boom from your seat as a boom in front of the Quad or close behind your seat could increase the risk of exposure to pesticides.

From 26th November 2015 new pesticide regulations come into force. Farmers can buy pesticides after that date but cannot apply the spray with their own sprayer unless they have completed the following:-

- Registered with the Department of Agriculture Food and Marine (<http://www.pcs.agriculture.gov.ie/>) as a professional user and
- Have completed the Pesticide Application module as part of a Teagasc (FETAC level 5 or 6) course will meet the requirements for professional user training (or equivalent)

All boom sprayers greater than 3m and all blast and orchard sprayers must be tested at least once by 26th November 2016 and the interval between inspections must not exceed 5 years until 2020 and must not exceed 3 years thereafter.



Wear the personal protective equipment specified for the equipment and pesticide in use.
Select the pesticide of least risk.

Work at right angles to the wind and turn into the wind to reduce contamination to yourself and the machine, Spray only in ideal wind conditions.

After spraying, clean contamination from Quad, particularly your controls and seat. You should be aware of environmental regulations if bulk volumes of water are used for this purpose.

Children

Never carry a child as a passenger. It is illegal and will reduce your ability to control the Quad.

Check the manufacturer's minimum age recommendations for your Quad. The ratio of a child's weight to that of the Quad is significant, as weight transfer is the key to safe handling.

In addition, the use of self-propelled machines on farms is covered in the Code of Practice on Preventing Accidents to Children and Young Persons in Agriculture (http://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Code_of_Practice_on_Preventing_Accidents_to_Children_and_Young_Persons_in_Agriculture1.html). This code indicates that children under the age of 14 should not be allowed to drive or operate a self-propelled vehicle including Quad's on a farm.

Children over 14 years of age should only be allowed operate a Quad on the farm where certain conditions are met, including training, supervision and the following of manufacturer's instructions.

Roll bars, lap straps and weather cabs

Traditional rollbars are not required on Quads as they have been found to potentially increase the overall risk.

Research has shown that they are more likely to increase injuries by obstructing the rider either when thrown off or when jumping off during an overturn. This causes the rider to fall to the ground alongside the Quad and increases the likelihood of injury.

Lap straps should not be fitted. They prevent active riding and would be lethal without a full cab or roll cage.

New protective equipment such as the "Quad Bar" is currently under review and to be used in the EU will need to be CE Marked.



Weather cabs restrict a rider's ability to jump clear in an overturn. The rider is likely to be crushed within the cab unless it is strong enough to withstand the forces involved.

Carefully assess the risks for your particular conditions of use before fitting any such structures on your Quad and consult the manufacturer for information.

Road use

Quads, unless registered with the Revenue Commissioners cannot legally be used on a public road. If the Quad does not have a Certificate of Conformity the Revenue Commissioners will not register the vehicle and it must be transported by trailer when moving on or across any public road.

Where registration is granted, the vehicle must be taxed, insured and driven by a licensed driver when used on the public road. Furthermore the vehicle must comply with the Road Traffic Legislation that applies to all vehicles using the public road, i.e. the requirement to be fitted with brakes, lights, mirrors etc.

Further information on the general standards applicable to vehicles being used on the public road can be obtained from the Vehicle Standards Section of the Road Safety Authority.
www.rsa.ie.

(Note: The enforcement of Road Traffic Legislation is a matter for An Garda Síochána).

Case studies - Quads

- A farmer was killed when he was thrown from a Quad bike while he was travelling down a steep slope on his land
- A farmer was killed while out herding cattle at night on a Quad when he struck a telegraph pole
- A 35 year old farmer died following a fall from a quad bike which he was driving in his farmyard in the late hours on a Saturday night
- A 54 year old farmer was found dead under an overturned quad bike by his brother and a neighbour on a Sunday morning on a remote mountain area





Appendix 3 –Trailers

Tractors are now pulling increasingly heavy trailer loads. Gross weights up to 34 tonnes may be hauled, both in the field and on the road. Effective trailer brakes reduce both the distance required for stopping and the possibility of jack-knifing.



Trailers - Key safety points



- △ The tractor used must be fit for the task, i.e. its permissible towable mass (as specified by the manufacturer) is greater than or equal to the weight of the trailer being drawn and does not exceed the national weight limit for the trailer based on the number of axles fitted and axle spacing.
- △ Visit www.rsa.ie for information on the national weight limits applicable to agricultural trailers
- △ Brakes are correctly maintained
- △ The driver is aware of the length, width and height of the trailer
- △ The trailer brakes are coupled to the tractor and the brakes can be operated from the driving seat in the tractor
- △ The tyre pressure and tyre condition on both the tractor and trailer is correct.
- △ All wheel nuts are tight
- △ Lighting and reflective or conspicuous markings are fitted on trailers
- △ The hitch hook ring and trailer ring are regularly checked for wear and not overloaded, i.e. the trailer's drawbar does not impose too much load on the tractor's coupling



Check hitch condition regularly



Trailer brakes

The use of tractors and trailers without adequate braking has led to many serious accidents. It is critical that tractor and trailer combinations can be stopped safely and within a reasonable distance to ensure the stability and control of the vehicle combination is not compromised.

- The braking system for the trailer must be appropriate for the weight and speed of travel
- Expensive premature tractor brake failure due to overwork is likely if a trailer with inadequate brakes is used
- Brakes need regular adjustment and maintenance to ensure they work correctly



Trailers should have adequate brake

Stability of loads

- Make sure that the load is evenly distributed and well tied down
- Make sure that the trailer has sufficient hooks for strapping down a load
- Trailers must not be overloaded
- Match the tractor size to the trailer and to the load to be drawn



Incorrect loading of trailer and insecure loads are extremely dangerous



Wheels and tyres

- The wheels and tyres on trailers must be the correct specification for the conditions they are used in
- Make sure tyre pressures are correct
- Choose the most suitable type of rear axle for the trailer
- Regularly check wheel nuts for loosening

Lighting of trailers

Make sure that the tractor and trailer combination is visible especially when travelling on public roads.

From 1st January 2016 the revised lighting and visibility requirements for agricultural trailers and interchangeable equipment come into force. These are;

- Agricultural trailers and interchangeable towed equipment must be equipped with side lamps, rear lamps, stop lamps, indicators and number plate lighting. They must also be fitted with a marker lamp on their right hand side if, when coupled to an agricultural tractor, the overall length of the combination is more than 10 metres
- Agricultural trailers with a DGWV over 3,500kg must also be fitted with reflective rear markings. If these trailers form part of a combination of vehicles that is over 10 metres long, they must also have reflective side markings
- Finally, a rear 'LONG VEHICLE' marking must be fitted to agricultural trailers forming part of a combination of vehicles over 13 metres long

The reflective and 'LONG VEHICLE' marking requirements do not apply to pieces of interchangeable towed equipment that can carry more than three times their own unladen weight. For example, slurry tankers, fertiliser or manure spreaders, grain chaser bins, and so on.



Case study - Trailers with a tipping body

An agricultural worker was fatally injured when he was trapped between a trailer body and the chassis of a silage trailer, being lowered from the tipping position.



The space between the trailer body and the chassis should **never** be entered while the trailer is being lowered or raised. If access to this general area is required for any reason, the trailer should either be in the lowered position or if raised, the trailer should be suitably propped. Clear instructions to this effect should be given to others who work with or on such equipment.

Keep crushing zone clear or propped if left in raised position



Park trailers on support bracket for ease of hitching



Driving with a trailer

In the field

- Avoid overloading the trailer
- Watch the ground conditions
- Avoid sloping ground if possible
- Watch out for overhead lines



Never overload

Drivers drawing loads should apply the brakes slowly and change down gear before entering onto steep slopes.

In the yard

- Watch out especially for children and elderly persons who may cross in your path or behind you when reversing
- Establish a one way system for yard traffic if possible
- Always be vigilant and alert
- If possible use a helper when reversing
- When tipping loads in a yard watch out for overhead lines. Jump clear if you have to leave the cab – do not touch the tractor and the ground at the same time
- Only tip loads on firm ground
- Always return the trailer to its lowered position before moving off





- Consider the installation of reversing cameras. They will greatly improve visibility in the farmyard particularly for long trailers

On the road

- Ensure you have the proper licence and insurance
- Keep the lights, indicators and plates clean
- Ensure your load is secure before moving off
- Always know and follow the rules of the road
- Drive safely and at an appropriate speed to suit the application/ground conditions
- Do not carry passengers on loads
- Be seen at all times

Case studies - Trailers

- A farmer was killed when he was in the process of transporting round bales of silage on a bale trailer. Apparently the tractor and bale trailer jack knifed and turned over
- A worker was trapped in the tractor cab and sustained serious injuries when the tractor and trailer jack knifed and overturned due the towed trailer not having a braking system
- A child tragically died as a result of a fall from a round bale on a trailer attached to a tractor which was being driven on the public road
- A farmer was carrying out repairs underneath a twin axle trailer when it collapsed on him causing fatal injuries
- A farmer was inflating a tyre on a trailer when the tyre exploded, throwing him backwards against a steel door. He died of his injuries shortly afterwards





Appendix 4 - Front-end-loaders and farm tele-handlers

Most accidents involving front end loaders and tele-handlers are caused by machine instability, falling loads, injury to those in the vicinity of the working machine and incorrectly used machines.

Front end loaders

Front End Loaders are very versatile machines. They are a valuable tool for all kinds of work on the farm.

However, Loaders can change the stability of the tractor and therefore must always be used in a safe manner.







Front loaders are commonly used during the busy winter feeding months with various attachments (such as buckets, shear grabs, forks) depending on the work to be done.

The Front Loader in all circumstances is required to lift a weight so there is no margin for error.



Use appropriate equipment for the job at hand

Front-end-loader - Key safety points

-  Farmer's should match the loader to the tractor – avoid using an oversized loader
-  Only use a loader designed and approved by the tractor manufacturer
-  Avoid over-loading. Always keep the loader in a low position when carrying loads or when operating on sloping hilly ground
-  Never allow people to stand, walk or work under a raised loader
-  Regularly check the pins, bushings and mounting bolts on the loader – faulty parts can have serious implications
-  Check for leaks in the hydraulic hoses (using nitrile gloves and a sheet of paper) and repair immediately. Leaks will lead to the oil pressure dropping allowing the loader can drop down suddenly causing injury or death

Appendix 4 Front-end-loaders and farm tele-handlers



- △ Always lower the loader to the ground when the tractor is parked
- △ Take care when removing the loader from the tractor
- △ When the loader is removed from the tractor make sure it is stored safely and securely
- △ The tractor should always be fitted with a safety frame or cab to protect the driver from getting struck by the loader or a dislodged load
- △ Avoid overhead power lines – always be aware of the full height of the loader when in use



Loaders should be propped if left in the raised position

Tele-handlers (Telescopic handlers)

Tele-handlers are very useful machines for farm work however many serious incidents occur where the operator has not received adequate training.

Tele-handlers stand on a triangular footprint with the two front wheels and the rear-axle pivot point. The rear axle typically oscillates. As long as the machine's centre of gravity remains inside this stability triangle, the tele-handler remains upright.















Tele-handlers pose different risks



Driver competence is essential



Tele-handlers - Key safety points:

-  The safe working load (SWL) in tonnes or kilograms must be clearly marked on the machine. Never exceed the SWL
-  Take note of the load plate (weight limits) in the cab which will indicate the safe working load of the machine at different operating heights
-  Know your own limitations as the driver of the machine and always think safety
-  Drivers of tele-handlers should receive adequate training in the safe operation of the machine as it drives quite differently than other machines such as farm tractors
-  Always drive carefully with due regard to the ground conditions, as rough ground can easily cause an overturn
-  Counterweights will help the stability of the tele-handler and should be used if required
-  Tele-handlers create a blind spot for the driver. The cab is usually located on the left-hand side of the boom, creating a blind spot on the right-hand side
-  Look out for people working in the area
-  Never allow anyone to stand or pass under a raised load
-  Beware of overhead power lines. Know the maximum height or reach of your machine
-  Do not operate tele-handlers with broken or missing side windows
-  Do not operate tele-handlers with broken or missing mirrors and lights



Maintain in good condition



Case studies – Front end loaders and telescopic handler

- A 36 year old farm worker was apparently leaning through a broken or missing side window of a tele-handler when he was struck and killed by the descending boom. It is believed that he inadvertently operated the boom as he leaned out of the window and was unable to stop it
- An overloaded tele-handler tipped forward, crushing and killing a worker with the bucket
- A farmer had a narrow escape when his loader came off its brackets and crashed down onto the tractor cab. Apparently faulty loader pins caused this incident
- An elderly farmer was crossing the family farm yard when he was struck by a teleporter that was operating in the yard at the time
- Two children who were being transported in the bucket of a loader were killed when the bucket became detached and fell off
- A farmers wife who was crossing the yard with buckets of feed was run over and killed when her husband was operating a teleporter
- A farm worker was crushed and seriously injured by a tele-handler operated by an elderly farmer who had not received training in the safe operation of the machine
- A farm employee received serious burn injuries when she struck an overhead power line with a tele-handler boom whilst moving metal pig huts



Be aware of ground conditions and machine capability



Appendix 5 - Harvesting machinery

Grass mowers and toppers

Mowers and toppers are potentially very dangerous. Persons using them must be fully aware of the dangers and be competent to use them. There are two types of mowers in common use on farms, rotary mowers and flail mowers.

The main hazards associated with mowers are:

- Clearing blockages
- Ejected blades and flails
- Ejected stones and debris
- Moving parts and drives
- Being crushed between the machine and a wall or other structure
- Being crushed or struck when working under the machine
- Overturning on sloping ground



Know your ground and existence of rocks or any other obstructions

Grass mowers and toppers - Key safety points



Do's

- ✓ Ensure all operators understand the operating instructions and read the manual
- ✓ Ensure all parts of the mower are correctly guarded
- ✓ Check the guards before starting work
- ✓ Keep the skirting in good condition and replace if necessary
- ✓ Stop the tractor engine and disengage all controls **before** leaving the tractor
- ✓ Take extra care when working on sloping, steep or uneven ground



- ✓ Use suitable protective clothing when carrying out maintenance work, for example wear gloves when changing blades

Don'ts

- ✗ Operate the mower close to bystanders (serious risk of getting hit by broken blades or ejected debris, stones)
- ✗ Carry out maintenance work if the tractor engine is still running
- ✗ Attempt to clear blockages unless the tractor engine is turned off, blades have stopped and ignition key is removed
- ✗ Use a mower if any guards are missing or damaged
- ✗ Carry out maintenance work unless the mower is correctly propped



Switch off tractor before checking or adjusting the mower

Forage harvesters

The principle hazards associated with the use of forage harvesters (trailed and self-propelled) on farms are;

- unprotected moving parts,
- rotating cutter-head,
- contact with overhead power lines,
- clearing blockages from the spout (or header) when the machine is still running,
- noise,
- vibration, and
- contact with silage additives.





Forage harvesters - Key safety points

Do's

- ✓ Persons operating the machine must be trained and competent
- ✓ Follow manufacturer's recommendations for sharpening the knives
- ✓ Follow safe system of work for removing metal if triggered by metal detector
- ✓ Wear suitable personal protective clothing
- ✓ Always allow for the run-down time of the cutting mechanism before opening any guards on the machine
- ✓ Follow safety procedures when clearing blockages in chutes
- ✓ Take care when operating on slopes and uneven ground
- ✓ Check that all guards are in place and correctly fitted
- ✓ Check the location of overhead power lines in the field before starting and ensure the spout is not raised when passing under these lines

Don'ts

- ✗ Clear blockages until the engine and cutter-head have fully stopped
- ✗ Attempt any maintenance work until cutter-head has stopped rotating
- ✗ Attempt to clear blockages until the engine and tractor engine have stopped
- ✗ Carry passengers in a self-propelled harvester unless seats are provided
- ✗ Allow other persons near the tractor or forage harvester when it is working
- ✗ Work excessively long hours or when fatigued



Know spout (chute) height and keep clear of overhead power lines

Appendix 5 Harvesting machinery



Case studies – Forage harvester

- A worker was driven over and killed as he rested in cut sward
- A farmer's hand got caught in a Forage Harvester when he was carrying out repairs and he lost three fingers
- A part-time farm worker was electrocuted when he attempted to climb up the ladder of the silage harvester as it was passing underneath high voltage overhead lines



Balers

Many serious and fatal farm accidents are associated with the use of balers in the baling of grass crops and straw. Balers are in use at a very busy time of year on farms and this increases the dangers. A number of farmers have lost their lives while operating balers.



Keep balers maintained and ready for the baling season

Risks with balers

- Persons pulled into the baling chamber at the pick-up tines when blockages occur
- Persons trapped by the moving parts on the baler when clearing blockages
- Persons entangled by a poorly guarded PTO shaft on the machine



Know the risks with baler operations



Balers - Key safety points



Do's

- ✓ Ensure all guards are fitted on the machine before work begins
- ✓ Ensure all operators are fully trained and understand how to operate the Baler
- ✓ Operators must avoid rushing the job
- ✓ Follow safe systems of working, particularly when clearing blockages and rethreading the machine
- ✓ If there is a blockage always stop the machine, disengage the PTO and turn off the tractor engine
- ✓ Wear tight fitting clothing or overalls
- ✓ Read and follow the warning notices on the machine
- ✓ Take particular care when working with difficult and poorly spread grass crops
- ✓ If the grass windrow is uneven or is damaged by poor weather, move or reform it so that it is easier to lift with the machine
- ✓ Always prop up the tailgate with the ram provided
- ✓ Always release round bales from the machine at the bottom of sloping ground, never on a hill



Only trained and competent persons should make adjustments

Don'ts

- ✗ Attempt to clear blockages, unless the machine and tractor engine is stopped
- ✗ Attempt to correct a fault with the twine, unless the tractor engine is stopped



Ensure others are kept well away from the danger zones



- ✗ Carry out any maintenance work when the tractor engine is still running
- ✗ Use a baler that is not capable of dealing with the crop on the ground as this will lead to blockages



Look for early signs of problems and switch off machine before dealing with them



Where possible bale when crop is in good condition

Potato harvesters

Several people have been killed or seriously injured in recent years when working with potato harvesters.

Potato harvesters should be well maintained and safe working procedures should be followed at all times.

The owners of the potato harvester should complete a risk assessment on the machine. They should also ensure that all persons working with the machine are aware of the dangers and always follow safe work practices.



Young and inexperienced persons should not work on or near potato harvesters.

The main hazards when operating potato harvesters are:

- Getting caught in the rollers
- Run over by the tractor and harvester
- Falling from ladders or sorting platforms
- Getting caught in conveyors or elevator chains
- Getting caught in the drive mechanisms
- Getting caught up in the PTO shaft
- Manual handling bags of potatoes

Potato harvesters - Key safety points

Do's

- ✓ Ensure all operators (casual helpers, contractors) understand the risks and potential dangers when working with potato harvesters
- ✓ Ensure all operators (casual helpers, contractors) understand the safety instructions and methods of operating the harvester safely
- ✓ Provide clear instructions on the safe means of cleaning the harvester
- ✓ Agree a reliable system of communication between the tractor driver and the person on the platform
- ✓ Before start-up check that all guards are in place and are correctly fitted
- ✓ Ensure there is a secure and safe working platform on the machine
- ✓ Fit an alarm or emergency stopping device on the platform
- ✓ Ensure all the PTO drives and all hydraulically driven parts are stopped before attempting any repair work or clearing blockages. Always stop the tractor and take out the keys
- ✓ Seek help when reversing with the machine and move very slowly
- ✓ Stop the tractor before anyone gets on or off the potato harvester
- ✓ Take your time when operating in wet or difficult conditions e.g. with damaged haulms or weedy crop, to avoid blockages in the machine



Don'ts

- ✗ Attempt to clear blockages or repair the harvester unless all drives are stopped
- ✗ Attempt to jump on or off the harvester when it is moving
- ✗ Leave the driving position of a moving tractor
- ✗ Operate the harvester when guards are missing or damaged
- ✗ Allow children on or near the harvester
- ✗ Carry out maintenance work on or near overhead power lines
- ✗ Overload the harvester

Case study – Potato harvester

An operator was working on a potato harvester when her right hand and arm were taken in between the elevator web and the clod roller. The guard covering these parts had deteriorated so much that it offered no protection.



Combine harvesters

The principal hazards associated with Combine Harvesters are:

- Entanglement
- Falling from the combine
- Being run over by the combine
- Contact with overhead power lines
- Contact with the cutting knives, take-up reel or rotor
- Contact with the straw chopper or spreader



Know the risks with Potato Harvesters



- Trapping under the header of the combine
- Struck by the header falling from its transport trailer
- Getting caught up in the drive mechanism
- Getting caught and pulled into the bin clearing auger
- Fire
- Dust exposure
- Noise

It is important to remember that a combine harvester can cause injury due to impact and from entanglement.

Combine harvesters - Key safety points



Do's

- ✓ Ensure operators have read and understand the instruction manual
- ✓ Ensure that all operators are made aware of the risks and understand how to operate the machine safely
- ✓ Always stop the engine, put controls in neutral position and take out the ignition key before doing any cleaning and maintenance work
- ✓ Beware of overhead power lines in the fields
- ✓ Follow safe work practices, for example, use supports when working under the header, avoid injury when working on the cutting knives
- ✓ Close the cab door to reduce noise and dust levels
- ✓ Keep cab clean and free from waste papers, rags and bottles. (Note - bottles in a cab could interfere with the safe operation of foot pedals)
- ✓ Be particularly vigilant when reversing the machine – move slowly and sound the horn
- ✓ Wear suitable close fitting clothing and PPE including anti-slip boots and avoid wearing loose fitting clothes
- ✓ Be careful when operating on sloping ground. Avoid sudden changes of direction, turn slowly and carefully

Appendix 5 Harvesting machinery



- ✓ Ensure all machine guards are in place before use
- ✓ Clean straw and chaff from the engine area regularly.
- ✓ Ensure suitable fire-fighting equipment if fitted and serviced regularly.
- ✓ Close the cab door to avoid ingestion of grain dusts that may cause occupational health conditions such as asthma, farmer's lung, bronchitis, eye and nasal infections.
- ✓ Take your time when working with difficult crops (lodged or sprouted) or in difficult conditions

Don'ts

- ✗ Climb into or reach into the grain storage tank unless the engine and all augers are stopped and the ignition key is removed
- ✗ Climb on the combine unless steps are provided
- ✗ Carry passengers unless a suitable seat is provided and door can be closed securely.
- ✗ Work under an unsupported combine header
- ✗ Carry out maintenance tasks until the engine is switched off and stored energy released
- ✗ Operate the combine if the guards are not in place
- ✗ Carry or allow children near the combine at any time
- ✗ Allow elderly farmers to work alone on combine harvesters
- ✗ Overload the machine





Appendix 6- Spreading machinery









Slurry tankers

Tragically many deaths and serious amputations due to PTO entanglement accidents occur with Slurry tankers.



Know how vacuum tankers work and the risks

Slurry tankers - Key safety points

-  Ensure the PTO is adequately guarded. Many standard machines require the pump to be operated manually in relatively close proximity to the PTO shaft
-  Maintain the PTO shaft and cover and replace a damaged PTO guard immediately
-  Make sure the PTO shaft tubes can slide and are not seized up following periods of rest
-  Check that the universal joints are not seized up and there is no wear on the joints
-  Check that the hydraulic piping is not damaged
-  Check the hydraulic controls found on modern tankers
-  Check for leaks on the hydraulic ram
-  Brakes should be checked regularly



Keep slurry tanker well maintained

Case studies - Slurry tankers

- An agricultural contractor was killed when he got caught in the PTO shaft of a vacuum tanker while removing slurry from a slatted tank.



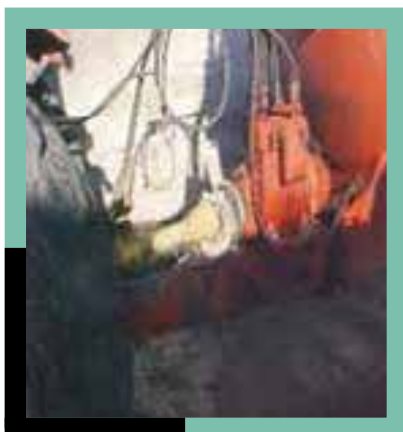
Appendix 6 Spreading machinery



- A farmer called into a neighbouring farm one day, where a tractor was agitating slurry with an unguarded PTO. The farmer went over to the tractor to see if the owner was there. Apparently the owner was elsewhere. In an instant the farmer's coat got caught up in the uncovered PTO and it pulled him in. He spent almost a year in hospital recovering from his injuries and was lucky to survive.



Consider ground conditions before spreading involved



PTO shaft must be completely covered including the U guard and O guard

*Muck spreaders pose risks
from moving parts and
ejected material*










Fertiliser spreaders

Fertiliser is spread on farms at various times of the year, depending on the farm enterprise. However, the majority of fertiliser is spread in the spring time and during the months of April, May and June.

Fertiliser spreaders - Key safety points

-  The tractor and spreader must be fit for purpose
-  All safety guards must be in place
-  Be particularly vigilant when loading the spreader. On many farms bulk or half tonne bags of fertiliser are now used. Lifting equipment must be certified and suitable for the job
-  Beware of bystanders when loading bulk fertiliser
-  Spreading fertiliser on sloping ground needs particular attention due to the risk of over-turning





Case studies - Fertiliser spreaders

- A farmer was killed when his tractor and mounted fertiliser spreader overturned. He was spreading the fertiliser on a steeply sloping field. Apparently the tractor tyres were found to be worn and the brakes had not been locked together. The tractor began to slide on the surface, which was slippery, and the tractor overturned
- A farmer was removing a fertiliser spreader from the back of a tractor when he got trapped between the rear of the tractor and the front of the spreader



Get training for specialist equipment



Appendix 7 – Post driving equipment

Hydraulic post drivers are designed as an attachment for tractors. The driver is raised hydraulically and then released in a free fall. Posts are driven straight into the ground under this force.

The Hazards associated with post drivers include crushing, impact, high noise levels, risk of eye injury, slips, trips and falls, risk of contact with overhead electrical lines or entanglement.

Post driving equipment - safety checklist












- Is there a guard fitted to prevent persons coming in contact with the hammer?
- Is there a shroud guard over the operating controls (valve chest) to prevent accidental operation?
- Are the operating control levers labelled to indicate their function and direction?
- When disconnected from the tractor, is the machine stable and unlikely to topple over when stored in the farmyard?
- Is the post driver fitted with a mechanism to hold and secure the post during the pounding operation?
- Is the post driver CE marked



Check that there is adequate guarding on the post driver



Post driving equipment - Key safety points

-  Read and understand the operating manual
-  Never operate the post driver if persons are in the immediate area, especially children
-  Never put your head, hands or fingers between the hammer and post
-  Do not stand directly in front of the Post Driver while operating
-  Always wear hearing protection
-  Grease the Post Driver at regular intervals as per the manufacturer's recommendations
-  Ensure that the tractor is of a sufficient weight to be stable with the Post Driver attached
-  Ensure that the Post Driver is properly attached to the tractor
-  Check that all hydraulic fittings and connections are tight and in good condition
-  Check that the wire rope clamps are tight and that the wire rope is in good condition
-  Check for damaged, missing or worn parts and replace immediately





Appendix 8 –Diet feeders

Know how the diet feeder works and the risks involved.











Diet feeders are used to mix concentrate and forage rations for feeding to livestock on farms. The mixed rations can then be dispensed evenly to the livestock.

Diet feeders have several safety features built in at design stage. The safe operation of these machines is ultimately the responsibility of the operator.



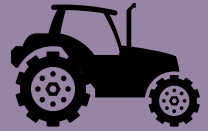
Know how the diet feeder works and the risks involved

Diet feeders - Key safety points

-  Ensure the PTO shaft is correctly guarded at all times
-  Do not attempt to access the mixing chamber when the machine is working
-  Always disconnect the PTO and hydraulics before carrying out maintenance on the machine
-  Do not allow any passengers on the machine
-  Ensure all the guards are fitted securely before operating the machine
-  Ensure the diet feeder area is always kept clear of people especially children and elderly persons that may be in the vicinity
-  Never remove the chain guards or inspection plates when the machine is running.
-  Good maintenance is essential. Regularly check all chains, sprockets, bearings and other moving parts
-  When driving with the diet feeder adhere to the recommended speed limit
-  Always park the diet feeder on level ground and engage the hand brake



Keep PTO & hydraulic lines in good condition



- △ Before storing the diet feeder, at the end of the season, wash out the machine and grease all the lubrication points
- △ Where a climbing ladder is provided to allow observation of the mixing process inside the diet feeder, care must be exercised not to lean in over the top edge of the machine. Both hands must be used to maintain a grip while standing on the ladder



Never open inspection plates during mixing

- △ Under no circumstances should any attempt be made to manually remove plastic covering from silage bales while standing on the ladder
- △ Under no circumstances should any attempt be made to pull plastic out of the mix while the machine is working

Case studies - Diet feeders

- A serious accident occurred with a farmer opened an inspection plate on a diet feeder to investigate a knocking noise. In a split second his arm was pulled in, while lucky to be able to phone for help and survive it resulted in an amputation of his arm
- A farmer was pouring an additive into a diet feeder from above while it was still running to aid proper mixing. He lost his balance and fell in and became entangled in the rotating mechanism which sadly resulted in his death
- A farmer was loading round bales into the diet feeder using a front end loader attached to a tractor. The diet feeder was working being powered by a separate tractor. It is believed he was at the upper part of the vertical ladder on the diet feeder when he reached over to retrieve a piece of plastic which was dangling from the round bale. He fell into the diet feeder and died





Appendix 9–Hedge cutters

Rotary flail hedge cutters are potentially very dangerous machines. There are many associated dangers that can lead to a serious injury to the operator or persons in the vicinity of hedge cutters.

Users of hedge cutters must always be vigilant and follow safe work practices to prevent accidents and serious injuries. Carry out a risk assessment to identify the hazards associated with this machine.



Know the risks involved with hedge cutting

The hazards associated with the use of Hedge cutters are:

- Being struck by flying objects i.e. machine parts or debris
- Getting caught up in the PTO shaft or other moving parts
- Being hit by the cutting head or machine arm in motion
- Contact with overhead power lines
- Trapped between tractor and machine when hitching or unhitching
- Tractor overbalancing and overturning when machine arm is extended
- Damaged hydraulic hoses causing injection of oil leading to skin and tissue damage
- Road traffic accidents

Hedge cutters - Key safety points

Do's

- ✓ Make sure the operator is fully trained and competent
- ✓ Make sure the operator follows the instruction manual
- ✓ Make sure the rear and side of the tractor are fitted with a suitable mesh or sheet guarding to protect the driver from flying debris of objects
- ✓ Make sure all guards are fit for purpose and in place
- ✓ Make sure all guards and safety devices on the machine are correctly fitted and maintained



- ✓ Make sure only recommended flails and fixings are used on the hedge cutter
- ✓ Make sure hydraulic pipes are protected against damage
- ✓ Always follow the manufactures instructions and safe work practices
- ✓ Take care when hitching and unhitching
- ✓ Check all fittings and couplings and keep in good working condition
- ✓ Make sure the tractor is suitable for the hedge cutter in use
- ✓ Always inspect the hedge before work commences and remove debris and foreign objects such as wire, bottles or cans
- ✓ Always use warning signs to alert others that work is progressing
- ✓ Do not rush – operate at a sensible speed taking account of working conditions
- ✓ Be aware of overhead power lines and operate safely
- ✓ Protect operators from noise, flying debris and objects
- ✓ Use ear protection and keep the tractor windows and doors closed
- ✓ When leaving the tractor practice the SAFE STOP and remove the keys
- ✓ Keep the working area tidy and remove unwanted debris
- ✓ Take particular care if working on roadside hedges
- ✓ Erect appropriate warning signs correctly positioned on the roadside
- ✓ Stop cutting if any person approaches or if debris could hit passing traffic

Don'ts

- ✗ Use a hedge cutter unless you are fully trained and competent
- ✗ Use a hedge cutter unless you are fully familiar with its controls
- ✗ Use a poorly maintained machine
- ✗ Use if any guards are missing



Install mesh on windows to protect from debris



- ✗ Use if hydraulic hosing is damaged
- ✗ Use a hedge cutter unless the tractor is fitted with mesh or sheet guarding at the side and rear
- ✗ Operate the machine if there are people nearby who may be at risk of injury
- ✗ Operate the tractor controls from any position other than the tractor driving seat
- ✗ Carry out any maintenance while the tractor engine is running
- ✗ Carry out any maintenance on the hedge cutter with the cutting arm raised unless the arm is fully supported
- ✗ Allow children on or near the tractor or hedge cutter

Case study - Hedge cutters

An elderly farmer was killed when he became entangled in a flail hedge cutter. He was seemingly exiting a field at an open gate as the flail cutter was reaching the gate and he became completely embedded in the flails



Carry and use signs to warn other road users



Appendix 10 - Revised standards applicable to agricultural vehicles

A suite of revised standards for agricultural vehicles take effect from 1st January 2016. A summary is as follows:

Braking – More powerful braking systems will be required for agricultural vehicles operating at speeds in excess of 40km/h.

Lighting & visibility – Agricultural vehicles will need to be equipped with appropriate lighting systems, flashing amber beacons and reflective markings.



Weights, dimensions & coupling

– New national weight limits are being introduced. These will enable tractor and trailer combinations which are un-plated to continue in use at limits which are safe for such vehicles, i.e. combinations of agricultural tractors and trailers, where either of them is un-plated, they will have their maximum towable mass capped at 3 times the tractor's un-laden weight.

Plated tractors and trailer combinations will benefit from being able to operate at higher weight limits of up to 24 and 34 tonnes for tandem and triaxle agricultural trailers respectively that meet certain additional requirements; i.e. they must be plated, they must be fitted with a flexible suspension system, they must be fitted with flotation tyres for operation at 10 tonnes per axle in the case of a tandem axle trailer or 9 tonnes per axle in the case of a triaxle trailer, and finally they must be fitted with a steered or steering axles if they have an axle spacing of 1.8 metres or greater.

Exemptions from compliance with the revised national weight limits are being provided for certain types of interchangeable towed equipment such as slurry tankers, manure or fertiliser spreaders and grain chaser bins.

Plating & speed rating - Trailers operating at weights exceeding 19 tonnes or at speeds exceeding 40 km/h will require fitment of both an authorisation (i.e. a national weights and dimensions plate) and a speed disc.

Further information on these new standards is available on the RSA's website (www.rsa.ie) in comprehensive lists of 'Frequently Asked Questions' which contain practical advice on achieving compliance with the new Regulations.



Notwithstanding these changes, a summary of the current requirements of Road Traffic legislation applicable to agricultural vehicles is as follows:

Brakes

Agricultural vehicles must be equipped with at least a service brake and a parking brake. Where a tractor is drawing a trailer which *exceeds 5 tonnes*⁴ in laden weight, the service brake must be of a continuous or semi-continuous type. Essentially, this means a single control, operated from the driving position, which is capable of being operated progressively and including an additional power source and controls to ensure a co-ordinated response between the tractor and the trailer.

Trailers must also be fitted with either a breakaway brake or safety chain. A breakaway brake is a braking device that is capable of automatically stopping the trailer if it becomes detached from the drawing vehicle while moving.

Lighting

Agricultural vehicles must be fitted with proper lights and reflectors and must be in good working order. Tractors must be fitted with two headlamps, two side lamps, two rear lamps, two rear reflectors, brake lights and number plate lights. Tractors and combinations must also be fitted with brake lights and indicators. Detached trailers parked in a public place after dark must be fitted with two side lamps, two rear lamps and two rear reflectors.

The use of white lights or ploughing lamps to the rear of an agricultural vehicle while on a public road at night is prohibited. This could confuse motorists into thinking that a vehicle is coming towards them.

Loose agricultural loads which project to the rear must be fitted with a load reflector fitted as close as possible to the extreme rear of the load and on the right hand side.

Weights and dimensions

Never exceed the maximum permitted weight limits for vehicles and axles set down in road traffic regulations nor the manufacturers maximum Design Laden Weight for the vehicle concerned.

⁴ Note that this 5 tonne figure reduces to 3.5 tonnes for operation at speeds in excess of 40km/hr.

Appendix 10 Revised standards applicable to agricultural vehicles



To ensure the stability of tractor and trailer combinations while travelling on the road it is essential that loads are drawn with *appropriately sized tractor and trailer combinations* with the correct braking systems fitted and working. Trailers should not be overloaded and tractor and trailer combinations should also travel at speeds appropriate to agricultural vehicles.

Vehicles or loads which exceed the maximum weight, length or widths allowable under national law require special 'abnormal load' permits from local authorities.

Spillage, road debris

Section 13 of the Roads Act 1993 states that it is an offence to allow stones, clay or any other material to remain on a public road where doing so would cause a hazard or potential hazard to people using the road and obstruct or interfere with the safe use of the road.

Drivers of tractors and other off road vehicles should try to ensure that the tyres of these vehicles are regularly washed down to avoid carrying mud and stones onto the public road. Tractors must carefully transport loose material such as silage, slurry, sand and gravel so that the material does not spill onto a public road and cause a crash. Loads of lime or other dusty materials, offal or other offensive material must be fully covered with a tarpaulin.

Licensing & insurance

To drive a tractor you must have a category W licence. The minimum age at which you may apply for a category W licence is 16 years.

Any vehicle used in a public place must be covered by third party insurance as required by legislation. Note that a public place includes public roads, a mart or a factory yard etc.



*A country where
worker safety, health
and welfare and
the safe management
of chemicals are
central to successful
enterprise*

**HEALTH AND SAFETY
AUTHORITY**

Tel. 1890 289 389

International
Callers

00353 1 6147000

www.hsa.ie