

Fatal traction

*Practical advice on avoiding
agricultural transport accidents*



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Introduction

Between 1986 and 2005 the largest single cause of fatal accidents in agriculture and forestry was being struck by a moving vehicle. If you add to this the death toll from overturning vehicles then this comprises a very large proportion of all deaths in agriculture and forestry.

The underlying causes for the most common categories of these accidents are the simplest and cheapest to rectify, eg poorly maintained tractor handbrakes, or poor rearward visibility such as no mirrors or obscured rear windows.

Statistics show that if you work in the agricultural sector for 20 years, there is a 1 in 568 risk that you will die as a result of an accident at work.

This leaflet is aimed at all those working in the agricultural industries who drive or operate mobile machines. It gives examples of typical accidents which have resulted in death or disability from vehicle movements in the workplace and offers advice on how to reduce these risks.

Those killed or injured include employees, the self-employed, voluntary workers, children and members of the public.

A wide range of vehicles are used on today's farms, from tractors to telescopic loaders, from all-terrain vehicles (ATVs) to combine harvesters. They all differ in size, shape and function, but statistics show they all carry a high risk of killing the driver or bystanders.

The examples used in this leaflet are based on actual accidents investigated by the Health and Safety Executive.

**MAKE SURE YOU DON'T
BECOME A STATISTIC...**

General advice

- Plan vehicle routes, and segregate pedestrians from them to help reduce the risk.
- Use mirrors fixed to buildings at blind corners and other devices such as speed ramps to help ensure a safer working environment.
- Remember that operators, for both practical and legal reasons, do need training on the use of tractors, ATVs, fork-lift trucks and other mobile machines, particularly if they are new to the industry. In some cases, eg fork-lift trucks and telescopic loaders, operators will generally need a certificate of competence.
- When changing from one vehicle to another, ensure you are aware of how all the controls work and the effects they have on the vehicle's movements. For example, parking brakes may vary in operation and position and often hydrostatic drive systems will be unique to the vehicle brand or model they are fitted to.
- After changing vehicles, allow yourself a little time to become familiar with the layout and operation of the controls before you set off. It is better to discover where the handbrake is *before* attempting a hill start towing a loaded trailer.

Vehicle maintenance

Worn or poorly maintained brakes, tyres and steering have resulted in many deaths. Ensure your vehicle brakes are regularly checked; keep mirrors clean and correctly adjusted and reversing alarms in efficient working order.

Note that, unlike other vehicles, there are no tyre tread depth limits for tractors which cannot travel at more than 20 mph, but you should ensure the tyres give enough grip for the tractor to carry out its task safely.



A farmer was killed when his four-wheel drive tractor and mounted fertiliser spreader overturned. He was spreading the fertiliser on a steeply sloping field on a summer evening. The ground had become slippery with dew. The tractor tyres were found to be 80% worn and the brakes had not been locked together. As he made the first pass down the hill, the tractor began to slide, slewed to the right and overturned. He was thrown from the cab on the second overturn and was struck by the cab as it came to rest on its roof.

- Make sure you check and regularly maintain the tyres and brakes on all your vehicles.
- Make use of seat belts if they are fitted, particularly for hill work, silage clamps and when driving on public roads.
- Train operators to enable them to spot potential hazards and to know the capabilities of the machines they use.



A farm worker was run over and killed as he tried to mount a runaway tractor. He was about to do some maintenance work on a farm building and had parked the tractor to load some wood. The hand-brake failed, causing the tractor to run away down a slope. He tried to mount the tractor, but fell under the rear wheel receiving crush injuries to the head and chest.

- Be aware of the braking capacities of your equipment, particularly that used for towing loaded trailers, slurry tankers etc. It may not be designed to take the weight of loaded trailed equipment.
- Ensure the parking brake is fully applied before leaving the vehicle.
- NEVER try to mount a moving or runaway vehicle - many people have been killed doing this.
- If it is safe to do so, park vehicles across the slope, particularly when loading attached trailers and muck spreaders.

A self-employed farmer was run over while jump-starting a tractor from the ground. He stood in front of the tractor offside rear wheel, leaned over the control position and operated the starter lever located on the nearside. There was no inhibitor switch in the starter circuit. The tractor was in gear - or was knocked into gear - with the throttle open. He was knocked down and run over by the tractor and then dragged along under the pickup of the attached unpowered baler. He received multiple fractures to his chest and died in hospital.

- Always start the vehicle from the driver's seat. People have been run over and killed trying to start vehicles from outside the cab.
- Remember to use the SAFE STOP procedures:
 - hand-brake on;
 - controls in neutral;
 - stop engine;
 - remove ignition key.

Passengers

Agricultural vehicles are generally designed to carry only the driver, although in recent years passenger seats have appeared in tractors and some self-propelled harvesters. Carrying passengers in vehicles who stand or ride in unsafe positions is a recipe for disaster and could land you in court.

A schoolboy helper was crushed to death by a trailer. A farmer was travelling between fields on a public road. He was driving a tractor which was pulling a trailer. The schoolboy, who was a family friend and who had been helping out during the holiday period with various tasks on the farm, was a passenger.

He was standing on the drawbar between the tractor and trailer and was holding on to the tractor's mudguards, leaning forward and talking to the driver. The farmer had previously told the boy to sit on the mudguards and not to stand on the drawbar.

The farmer was driving along the road at about four miles an hour. The boy fell or jumped off the drawbar. Before the farmer could apply the brakes, the trailer's wheel ran over the boy, resulting in fatal crush injuries to his chest.

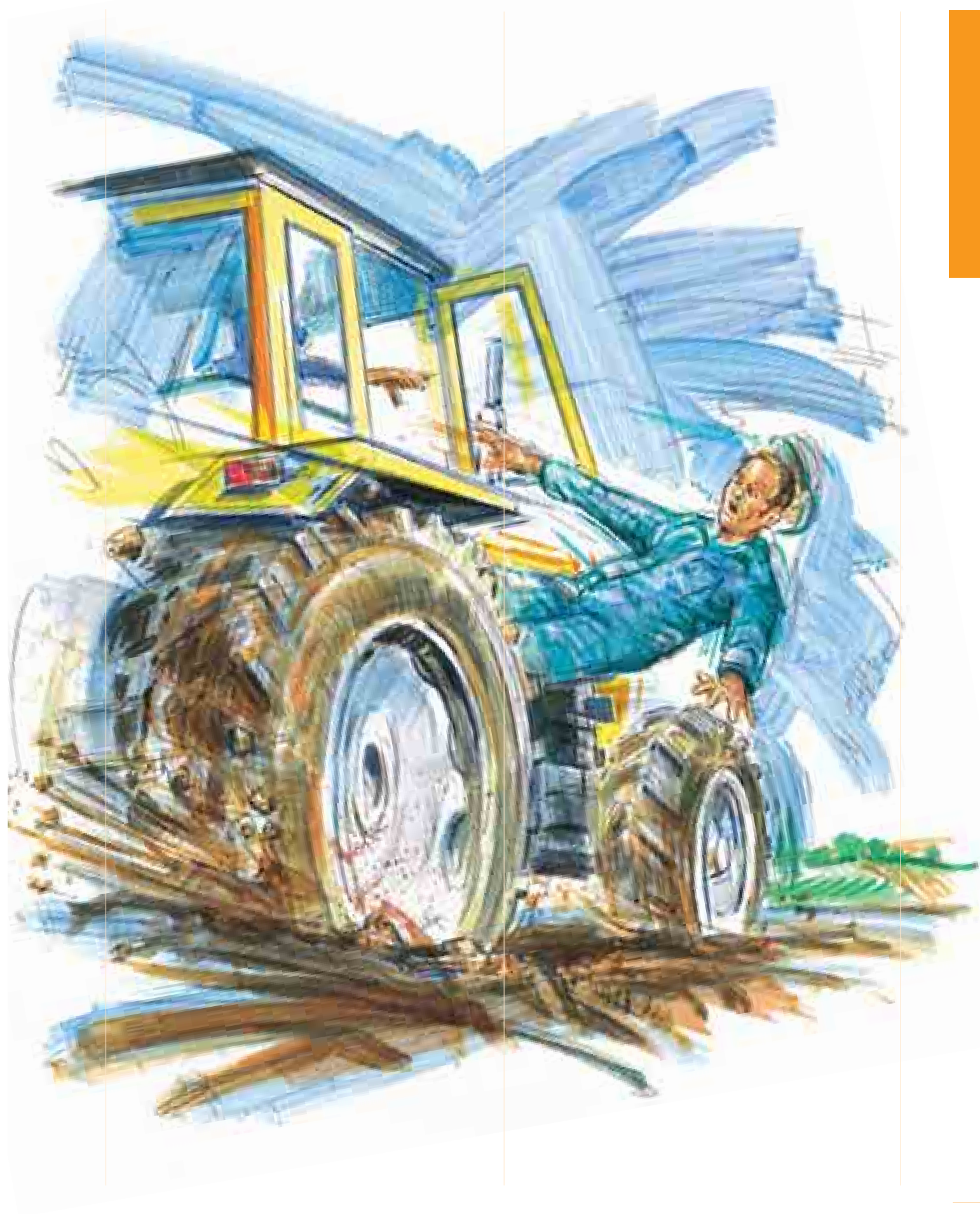
- **Keep children under the age of 13 away from all work activities.**
- **Never allow any passengers to travel on drawbars or mudguards of tractors.**
- **Only carry passengers in the cab if the manufacturer has fitted a proprietary passenger seat. NEVER carry children under 13 in the cab.**
- **Do not allow passengers to ride on cab steps or linkages.**
- **Make sure any passenger does not obstruct your use of the controls or obscure your vision.**

A farmer fell from a transport box and struck his head. He was transporting an injured cow in a purpose-made transport box attached to the front of a digger loader. He decided to travel with the cow and sat on the rear edge of the box. His son drove the machine at a walking pace on level ground. For an unknown reason the farmer fell backwards from the box, striking his head on the machine. He died in hospital from his injuries.

- **Even at slow speeds people can be killed if they ride in unsafe positions.**

An employee was run over by a telescopic materials handler. He had been riding in the cab of the machine which was being driven along a farm track. He was standing in the nearside footwell. The lower door section catch was missing but it was held shut by the upper section catch. The door opened and he fell under the nearside rear wheel and was killed.

- **Do not allow anyone to ride in unsafe positions in cabs or on linkages and drawbars.**



Visibility

Reversing tractors and towed equipment such as trailers is considered to be a skill; skills require training and practice.

Reversing

An employee was killed by a reversing vehicle. A tractor and attached manure spreader were parked on a farmyard, blocking a route that was to be used by two employees to bring in a herd of cows for milking. One of the employees asked the farmer to move the tractor and spreader. He started the engine and began to reverse while looking over his right shoulder, but after moving 4 or 5 m heard a scream and stopped.

The employee had been walking down the other side of the tractor when she slipped and fell head first underneath the wheel of the spreader. She received fatal crush injuries to the head.

- Never approach or walk behind or beside a reversing vehicle.
- If you must approach, attract the driver's attention first and get them to stop.
- Audible alarms can be fitted to vehicles to warn people when a vehicle is reversing.
- Get someone to guide you back if necessary.
- Ensure mirrors are clean and correctly adjusted.

A self-employed farmer received fatal crush injuries to the head when he was run over by a telescopic handler that was reversing out of a barn. Two farmers had been preparing to load a lorry which had arrived to collect some wheat. As one of the men began to reverse out of the barn doorway, the other decided to walk down the side of the vehicle. He was struck by the vehicle and fell under the wheel.

- If possible, try and avoid the need for reversing in the first place.
- If possible, have separate access doors for vehicles and pedestrians.
- Never attempt to squeeze between a moving vehicle and a doorway.
- Consider making some areas 'pedestrians only'.
- Moving from a bright environment into a dark interior can restrict visibility within the building as your eyes will take time to adjust. Appropriate lighting will help.



Forward visibility

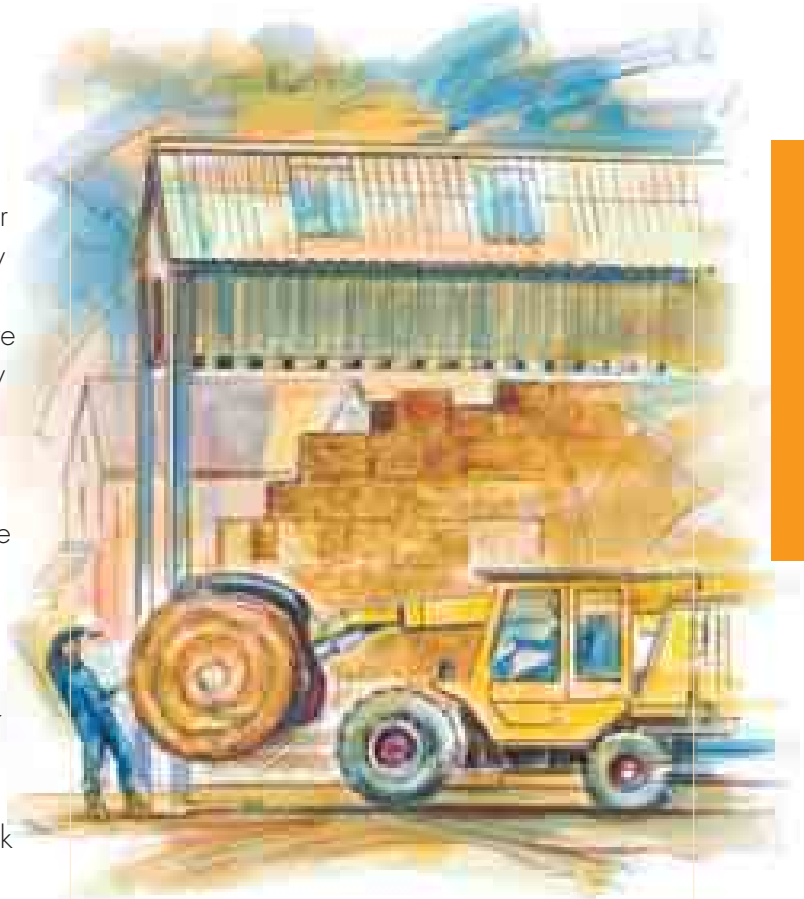
Drivers of loaders, fork-lift trucks and similar machines suffer from poor forward visibility when carrying loads in front of them. Position the load so that it does not obscure your vision, but if this compromises stability it may be safer to travel in reverse gear. For example carrying two big bags of fertiliser on the forks of a materials handler will dangerously impair visibility. Alternative methods must be used, especially in areas where other people are present or on public roads.

A two-year-old child died when her father was working in the yard with an excavator/loader tractor. The yard was being tidied up and he was using the back hoe of the tractor to move some building materials. The child had her own play area that was fenced off from the yard. From here she could see and hear her parents at work.

Somehow she managed to find her way into the yard. It is presumed that she stood in front of the loader bucket of the tractor to watch her father at work. Her father did not expect anyone else to be in the yard, least of all his daughter.

He changed driving position from using the back hoe to the normal forward looking driving position and moved off in a slight arc to go to another part of the yard. When he glanced over his shoulder he saw his little girl lying on the ground.

She died of crush injuries by being run over by both wheels of the machine.



- Keep children away from moving vehicles and any other work activities.
- Take a good look around the vehicle, using your mirrors if necessary, before moving off.
- Sound the horn before moving off, particularly if the vehicle has blind spots which mirrors cannot cure.
- If you are still unsure, get off the vehicle and walk around the machine.

A farmer had been to talk to the driver of a combine harvester. He left the cab and tried to climb down the access steps. The combine was still moving forwards. As he climbed down, he slipped from the ladder and was run over by the front wheel. The driver was not aware of the accident.

- Do not get on or off vehicles while they are in motion.
- Always attract the driver's attention before approaching the machine and ensure that it has stopped before climbing access ladders etc.

All-terrain vehicle quad bikes (ATVs)

ATV quad bikes have become very popular - their light weight and versatility have made them indispensable on some farms. Suitable training and the correct personal protective clothing are vital to ensure they are used safely.

Poor maintenance, excessive loading of ATVs or trailers and carrying passengers have led to a number of deaths. Carrying passengers is illegal as is the use of adult sized ATVs by young children under 16. (ATVs are sized for up to 12 years, 13 to 16 years and adult.)

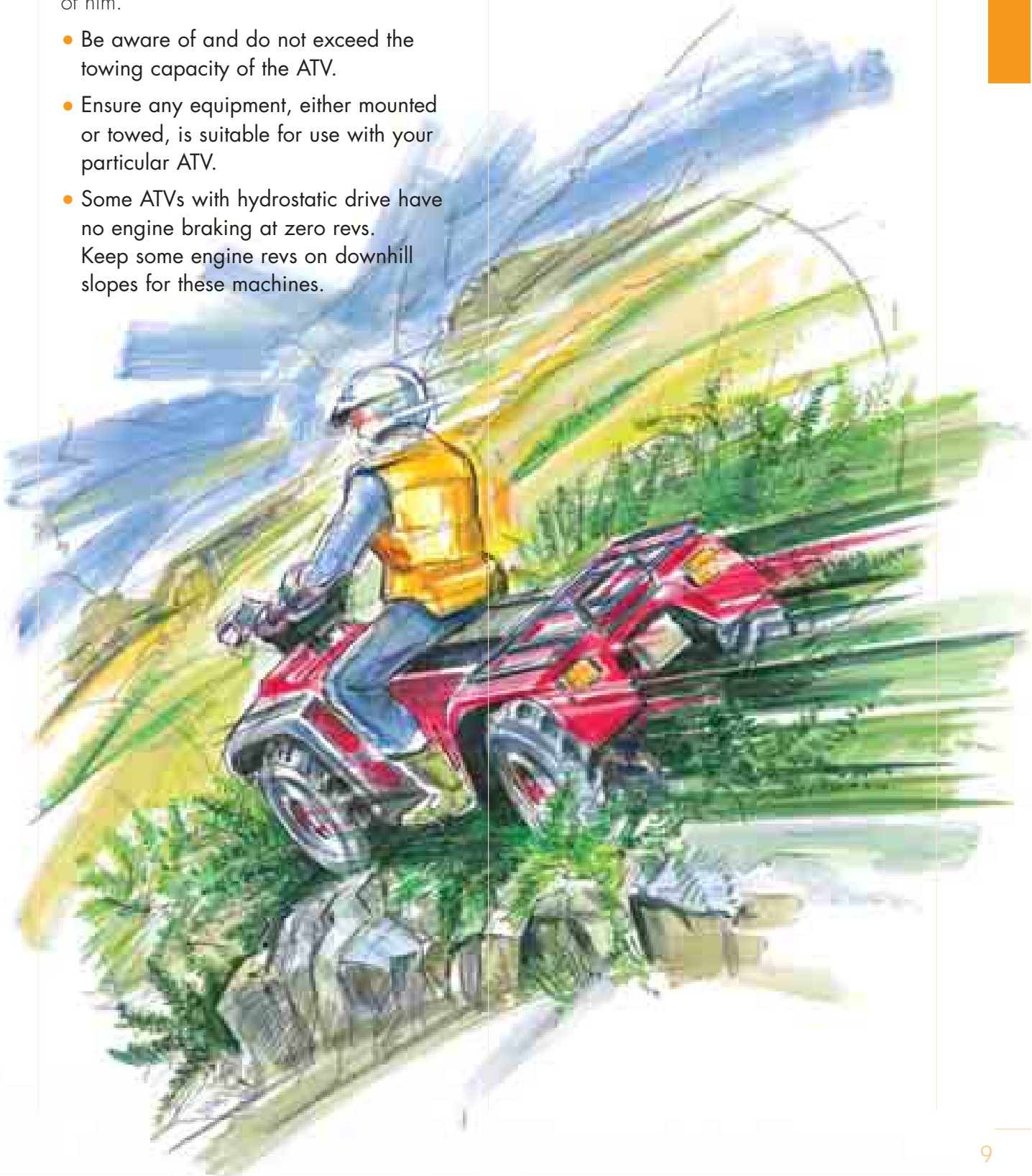
A farmer was thrown from an ATV and landed in a hole. He was helping to move cattle and was leading the way down a farm track. The track had a steady downhill slope of about 13° and levelled out before a left-hand bend. He didn't stop, went into scrubland and was thrown from the ATV. He had used the ATV for about two years, had not been formally trained and was not wearing any head protection. He died from a fractured skull.

A farmer was trying to separate a pregnant cow from others to bring her back to one of the farm buildings. The cow ran and tried to jump a wire fence. He was riding an ATV and tried to head off the cow with the bike but lost control. The farmer and ATV went through the fence and nose-dived onto the road which was 7 m below. He was wearing no head protection and had not received any formal training.

- Always wear head protection when using an ATV.
- ATVs have quite different handling techniques to all other farm machines, which is why everyone using an ATV at work should have received appropriate training. Keep your speed down, particularly on uneven surfaces.

An employee was driving an ATV which was pulling an overloaded trailer. As he was descending a 1 in 4 grass slope, the ATV lost traction and braking efficiency. As the load pushed forward, the ATV jack-knifed, causing the driver to be thrown from the vehicle which then landed on top of him.

- Be aware of and do not exceed the towing capacity of the ATV.
- Ensure any equipment, either mounted or towed, is suitable for use with your particular ATV.
- Some ATVs with hydrostatic drive have no engine braking at zero revs. Keep some engine revs on downhill slopes for these machines.



Overhead power lines (OHPLs)

Many farm vehicles now exceed or come close to the height of power lines, eg sprayers, self-propelled forage harvesters, telescopic loaders, the markers on large seed drills, vegetable harvesters and combine harvesters. The accidents below show how important it is to be vigilant at all times with these and other machines.

A tractor driver was electrocuted when his tipped trailer struck an overhead power line. A contractor had been engaged to remove manure and deliver it to a field site owned by another farmer. The team of three had spent some time on this farm several weeks earlier and were travelling to the same tipping site as before.

As the driver drew forward from the heap with the trailer raised, he struck the 11 000 volt overhead power line. When he tried to get off the tractor he made an earth contact and was electrocuted.

- Check tipping sites/areas for the presence of ANY overhead lines.
- Keep forward movement with a raised trailer body to a minimum.
- Ensure tipping sites are at least 9 m away from any overhead lines.
- If the site cannot be moved, arrange to have the overhead lines diverted or buried.
- If contact is made with power lines, first attempt to drive off the lines. If this cannot be done then stay on the machine until the lines are confirmed as closed down. If it is essential to get out of your machine DO NOT STEP DOWN. Always jump as far clear as you can and keep your feet together.
- Remember to LOOK UP! LOOK OUT!

A farmer was combining wheat. The driver passed under some 11 000 volt OHPLs when his CB aerial contacted the power lines or came close to them inducing an arc. This immediately burnt out wiring which stopped the combine, set it on fire and then set the crop on fire. The operator jumped clear. The weather had been hot and it is possible that the power lines had expanded and sagged lower than their normal height above ground.

- Do not make your vehicle taller by fixing an aerial onto the cab roof.
- Be aware of all line heights around your farm and check the height of your machines and before buying new machines. Inform employees and visiting contractors of line heights where they will be working.

On the road

Specific legislation applies to vehicles which travel on public highways.

The primary enforcement body is the police. Below are some basic points for you to remember when travelling on the road.

NOTE: THE FOLLOWING DOES NOT GIVE DETAILED ADVICE - CONSULT THE POLICE IF IN DOUBT.

Trailer brakes

- All trailers (with the exception of agricultural trailed appliances) with a gross weight of more than 750 kg must be fitted with brakes.
- Agricultural trailed appliances with a gross weight of more than 14 230 kg must be fitted with brakes.
- Brakes must be capable of being applied to at least two wheels or at least half the wheels if the trailer has more than four wheels.
- Trailers which are drawn at speeds in excess of 20 mph must meet the full requirements applicable to ordinary goods-carrying road trailers.
- If the gross weight of the trailer exceeds 14 230 kg, the trailer brakes must be applied by the tractor braking system.

Projections

- All sharp and/or dangerous edges must be protected and marked.
- Any vehicle extremity, including bale spikes, should be visible by any person from a reasonable distance and should be protected to prevent injury to any person.
- When driving a rough terrain fork-lift truck or telescopic handler on the road, forks and other attachments should be removed or otherwise folded back or covered.

- Use the appropriate marker boards and remember to ensure there is adequate lighting at night.

All gates off public roads

Consider the position of the farm or any field entrances which are off public roads. Many accidents occur when vehicles are turning into or leaving fields adjoining public roads. Gates can often be moved to a position which gives better visibility and can be recessed to allow a tractor and trailer to pull in before opening the gate. Hedges or trees can be removed to improve visibility. Ensure indicators are clean and working correctly both on tractors and trailers.

Sheeting and lashing

- Make sure that when carrying loads on trailers:
 - the load weight does not exceed trailer and axle capacity;
 - the load is correctly distributed;
 - the load is secured correctly using an appropriate method, eg rope, webbing, chains etc.
- Make sure that restraints are sound and that lashing points are secure.
- Check lashing restraints are still tight several times during a long journey.
- Carry a spare restraint in case one breaks.

Find out more

HSE publications

Tractor action: A step-by-step guide to using tractors safely INDG185(rev1) HSE Books 2003 (Single copy free or pack of 10 ISBN 0 7176 2711 X)

Workplace transport safety: Guidance for employers HSG136 HSE Books 1995 ISBN 0 7176 0935 9

Managing vehicle safety at the workplace: A short guide for employers INDG199 HSE Books 1995 (Single copy free or pack of 10 ISBN 0 7176 0982 0)

Reversing vehicles INDG148 HSE Books 1993 (Single copy free or pack of 15 ISBN 0 7176 1063 2)

HSE videos and video packages

Fatal traction - Over the last 10 years, transport accidents have been the largest single cause of fatal accidents in agriculture and forestry. This video highlights the dangers and gives practical advice on how to avoid them (ISBN 0 7176 1952 4 £25.00 + VAT)

Tractor action pack (includes a detailed training guide, a leaflet and a video) ISBN 0 7176 2712 8 £30 + VAT

HSE videos are available from HSE Books (see 'Further information').

Other publications

Code of Practice: Safety of loads on vehicles (2nd edition) Department of Transport The Stationery Office 1984 ISBN 0 11 550666 7

Road Vehicles (Construction and Use) Regulations 1986 (as amended) The Stationery Office SI 1986/1078 ISBN 0 11 067078 7

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