



Farm Safety Association

Farm Tractor Safety:

A GUIDE TO SAFE FARM TRACTOR OPERATION



INTRODUCTION

Modern farm tractors provide most of the muscle power needed for today's high output agricultural enterprises. Tractors are more common on farms than any other piece of equipment and are used to carry mounted and semi-mounted implements, to transport equipment and materials, to pull tillage equipment and wagons and as remote power sources for other equipment

Unfortunately every year, tractor accidents result in serious disabling injuries and tragic loss of life. Losses due to property damage, medical bills, time off work, reduced productivity and insurance costs are considerable. The major causes of injury and death to tractor operators are rollovers, falls and contact with tractor attachments.

Statistics show that in Ontario 244 people died as a result of tractor-related accidents between 1980 and 1994. This accounted for almost 48% of the total fatalities for that period. Clearly one-half of all fatalities are caused by this agent of death. The vast

majority (about half) of these fatalities were tractor rollovers to the side or the rear.

During a recent eight year period in Ontario, there were more than 450 hospitalizations for accidents involving farm tractors. The average length of stay in hospital was 10 days for these injuries with a maximum for one individual of 130 days for an accident involving a power takeoff shaft contact.

Manufacturers are continually improving the design of tractors to make them more safe. However, they are unable, as yet, to build in mechanisms which recognize unsafe conditions. Tractor operators who know their machine and are aware of the hazards which may occur, are better equipped to avoid a tractor mishap.



TYPES OF TRACTOR RELATED ACCIDENTS

Rollovers or overturns are involved in about half of the fatal tractor accidents and are responsible for many disabling injuries and much property damage. With the use of protective frames and crush-resistant cabs with seat belts, the number of serious and fatal injuries from such accidents should decrease. Rollovers are generally due to driving too

fast for conditions; striking surface hazards such as rocks, stumps and holes; running into ditches; hitching high for extra traction; driving on steep slopes; and operating front-end loaders improperly. Tractor upsets also occur when handling large round hay bales and other heavy loads with front-end loaders.

Falls from moving tractors often result in serious and sometimes fatal injuries. Many times the victim is a child, but operators and adult riders can also fall. Falls often occur from smaller and/or older tractors used around the farmstead, where extra riders and overhead hazards are more common than in fields.

Another cause of tractor-related death and serious injury is being caught by, or entangled in, rotating power takeoff (PTO) shafts. In most cases, the PTO shields were inadequate or had been removed.

Other tractor-connected injuries and damage involve:

Colliding with motor vehicles or roadside objects;

Slipping and falling while mounting and dismounting;

Running over bystanders;

Striking overhead hazards;

Being struck by flying objects, broken parts, or hydraulic fluid;

Being crushed by a poorly supported tractor during repair work;

Sustaining cuts, bruises, burns and other nuisance, but painful injuries, connected with maintenance and routine operation;

Being overcome by exhaust gases inside closed buildings;

Being burned by fires that erupt during refueling or as a result of a collision or upset.



HOW TO REDUCE THE RISK OF TRACTOR ACCIDENTS

Be Physically and Mentally Fit

There are numerous human factors involved in fatal tractor-related accidents. Certain factors like poor judgment, poor attitude, insufficient knowledge or training, fatigue, haste, stress, depression, intoxication, or showing off can cause a fatal tractor overturn accident.

Each operator should be physically and mentally fit when operating a tractor. An operator who is sleepy, tired or not feeling well may not be able to react in time to avoid an accident. Your tractor does what you make it do.

Be Properly Trained

A person who does not know how to operate a tractor safely in potentially hazardous situations can be injured or killed by exercising poor judgement. Make sure all persons permitted to operate tractors have been thoroughly trained. A good place to start training is with the operator's manual. Review the operator's manual, if possible with the tractor in front of you.

Be Familiar With Operator's Manual

Read and follow procedures as outlined in the operator's manual. By being familiar with the operating features of a tractor, the operator will develop confidence when the tractor is driven under adverse conditions. Learn the location and purpose of all of the gauges and controls as well as other indicators. Knowing where the controls are by memory can allow you to react more quickly in an emergency situation. There have been accident situations where individuals have become entangled in machinery or the power takeoff shaft and rescuers or family did not know how to disengage the equipment. Family members should be showed how to shut down equipment or disengage the PTO

in case of emergency.

Study the various decals on your equipment. They may point out DANGER, WARNING and CAUTION for various points on the tractor. Have an experienced tractor operator with you as you review the various decals and ask questions!

A copy of all operating manuals and other relevant safety materials should be kept on file for quick reference.

Use Tractor for Intended Purposes

The tractor has many uses around the farm, however, improper use can result in an accident. For example, using the tractor to round up the cattle is dangerous because the operator may encounter rough, uneven ground and make sharp turns at high speeds.

Check Tractor Before Operating

A pre-operational check of the tractor will assure you that it is in safe operating condition. Check the tires for proper inflation and defects, windows for visibility, seat position, seat belts, brakes for adjustment, steering response, rear view mirrors, slow-moving vehicle emblem, reflectors, and running lights for day or night time operation.

Safety Check: Walk around the tractor and any attached implement checking the area for obstacles that may be under or near the tractor. This includes stones, boards, children's toys etc. Make sure there are no bystanders; remember this is a work area. Check that the wheels are free, not frozen or stuck in the ground. If the rear wheels are frozen to the ground, then the tractor may flip backwards around the axle when power is applied. Check for any loose parts or objects on the tractor such as tools on the platforms or around brakes and other controls.

Service Walkaround: Walk around the tractor a second time to check the tractor itself. This time look at the tires for wear and inflation, the power takeoff shaft for shielding and guarding (rotate the shield to make sure it moves freely), the hitch for proper hitch pin and safety clip. Pay particular attention to the ground under the tractor for any signs of liquid leaks such as oil, coolant or fuel.

Check the oil: Remove the dipstick, wipe it clean and check the oil level. If oil is required, remember to wipe off the filler cap before you remove it to avoid dirt falling into the engine. Use a **clean funnel** and clean the top of the oil can to prevent rust or other foreign objects going in with the oil.

Check the radiator: Slowly remove the rad cap and check the liquid level.

Check the air pre-cleaner and air cleaner. Remove and shake out any dirt.

Check the fuel level. Fill if necessary, but it should have been filled at the end of the last day the tractor was used.

Check the fire extinguisher. Your tractor should have a fire extinguisher in case of fire during operation or refuelling. Make sure it is charged and easily accessible.

Any noted defects should be corrected immediately. These can affect performance and your safety!

BATTERIES: HANDLE WITH CARE!

Occasionally it may be necessary to handle, adjust or change the battery on your tractor. Batteries contain sulfuric acid which can cause considerable harm if it comes into contact with your skin. They can also produce mixtures of hydrogen gas and oxygen which can explode if contacted with heat or sparks. Remember these safety points:

1. Do the work or adjustments in an area free of sparks and heat sources. Don't smoke while working near the battery. Make sure the area is well ventilated.
2. Always wear personal protective equipment, covering the eyes and hands. A full face shield will offer the most protection.
3. Never work leaning directly over the battery.
4. Always disconnect the **ground cable** first and identify the cables as positive and negative so that you don't re-attach them wrong.
5. Make sure that you clean the terminals and

cable connections before re-attaching them. Make sure the new battery is secured with the hold-down assembly provided.

6. While installing the battery make sure that the terminals don't come into contact with metal parts on the engine or tractor body.
7. Make sure that you connect the ground cable last to prevent sparks and tighten the connections!

HYDRAULIC SYSTEMS AND SAFETY

Working with or on hydraulic equipment can be dangerous. Some of the hazards cannot even be seen readily. Hydraulic systems are under tremendous pressure and this is where the unseen danger lies.

Before servicing hydraulic systems:

1. Shut off the engine powering the hydraulic pump.
2. Lower the implement to the ground.
3. Relieve pressure by moving the hydraulic control lever back and forth.
4. If working around or under a raised implement, make sure that it is blocked or supported by something other than the cylinder itself.



5. Use a piece of cardboard or wood to check for leaks in hoses and fittings. Even a small amount of pressurized hydraulic fluid can be injected through the skin and cause severe health problems. Seek medical attention immediately if hydraulic fluid penetrates your skin.
6. Use caution when releasing blocks or transport locks on equipment. If a cylinder has leaked and lost pressure, the implement

may fall to the ground as the locks are released. **An Ontario farmer was killed when a cultivator wing fell on him, due to fluid leakage from a hydraulic cylinder. Normally the cylinder would have kept the wing from dropping.**

OPERATOR'S CHECKLIST FOR PERSONAL SAFETY

Before even considering starting the tractor, ask yourself the following questions:

Yes No

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Are you in good health? |
| <input type="checkbox"/> | <input type="checkbox"/> | Are you free from the effects of drugs and alcohol? |
| <input type="checkbox"/> | <input type="checkbox"/> | Are you wearing hearing protection? |
| <input type="checkbox"/> | <input type="checkbox"/> | Are your close snug-fitting? |
| <input type="checkbox"/> | <input type="checkbox"/> | Are you wearing safety glasses? |
| <input type="checkbox"/> | <input type="checkbox"/> | Is any long hair tucked under a hat? |

If you answered **NO** to any question, **DO NOT OPERATE THE TRACTOR!**

STARTING AND STOPPING YOUR TRACTOR

1. If your tractor is indoors, you must provide adequate ventilation by opening doors or windows and using exhaust fans if available. Carbon monoxide is a deadly gas and can build up rapidly in a confined or relatively closed area. Carbon monoxide is always present in the exhaust of all engines.

2. Start the tractor **only from the operator's platform**. Many modern tractors cannot start unless the clutch pedal is depressed, but some older tractors still in use can be started while the operator is standing on the ground. This **must never be done**. There are recorded cases of farmers who have been killed while attempting to start the tractor while standing next to it. The tractors in question were either in gear or the operator bumped the gear shift, causing the tractor to lurch forward and run over them. **Never attempt to bypass the safety start switch.**

3. Check the Power Takeoff controls to make sure that they are disengaged, and that the transmission is in neutral and the clutch depressed.

4. Start the engine following recommended starting procedures in your operator's manual.
5. Allow the engine to warm up before starting to work with it. Working a cold engine is a major source of contamination of engine oil.
6. Check all the instruments. Make sure that there is proper oil pressure, that the battery is charging etc.

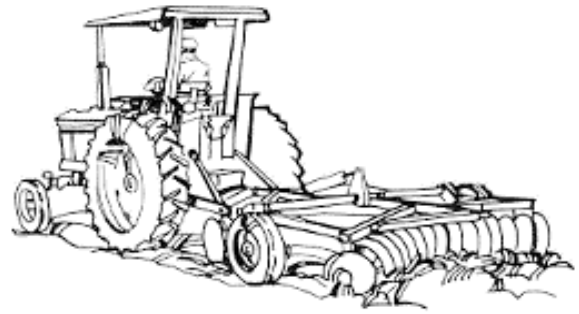
Shutting down the engine:

1. Always allow an engine to cool down at a fast idle before shutting it off. This allows the valves and pistons to cool down uniformly. Lower all hydraulic lift equipment to the ground.
2. After shutting off refill the fuel tank when the tractor has cooled a bit. Make sure that the park brakes are locked. Check that there is no combustible debris near the exhaust system.

Note: Everyone on the farm including family and employees should be taught how to safely shut off machinery. This is especially important in an accident situation. The first person on the scene must know how to shut things off. It could save a life!

Take Special Care With Large Four-Wheel Drive Tractors With Articulated Steering

Operating large four-wheel-drive tractors with articulated steering requires skills in addition to those necessary for operating a two-wheel-drive tractor. The operator must be especially concerned about safety because of the increased power and large dimensions of the tractor, faster speeds, and different visual perspective.



OPERATING YOUR TRACTOR

Adjust your operator's seat so that you can comfortably reach the pedals and controls. Check for visibility all around and adjust any side mirrors that you have. If mirrors or windows need cleaning, take the time to do it. You don't want an accident on the roadway because you didn't see a vehicle behind a smudge. Make sure that the operator's platform is clear of objects or debris. It is not uncommon for something to interfere with pedal operation. If your tractor is equipped with a rollover protective structure, buckle your seatbelt on before starting up.

Make sure that everyone is clear from around the tractor before starting it in motion. There have been **many fatalities** in Ontario where small children were not seen and were run over. Sometimes you may wish to sound the horn to warn others that you are moving out. This also gives you the opportunity to test the horn before highway travel.

Case History: Unaware of the two year old victim's presence, the driver of a tractor backed up and ran over the victim.

When you engage the power to the drive wheels, do so slowly.

Test your **brakes** as you start out at a slow speed. Likewise turn your steering wheel in each direction to make sure it operates as it should. Power steering should be quick and responsive.

If the power steering ceases to operate, stop the tractor immediately.

If a load is attached, make sure that it is hitched to the drawbar. Pulling from any point above the rear axle could cause the tractor to flip over backwards. Make sure that you are using a drawbar pin that locks in place, and is of proper size for the job at hand. Often we have seen operators trying to "**make do**" with a bolt or pin too small and a bump

or other situation could pop the pin and cause you to lose your load.

When heavy loads and equipment are attached to the rear of the tractor you may notice that the front of the tractor may start to rise. If this occurs, you should install front-end or wheel weights to help keep the tractor stable.

Watch where you are going while operating the tractor, particularly near ditches and embankments, on the roadway and near obstacles such as rocks and trees. Watch for overhead powerlines, especially if you are pulling implements or a load that may come near them. If a long grain auger or other high load contact or even comes near some lines, an electrical charge may follow the easiest path to ground which could endanger your life.

Too often we hear of tractors and wagons jack-knifing. If any towed vehicle has a total weight that exceeds that of the towing tractor, then the vehicle should have independent brakes for safe operation.

Use Engine Braking

Using the braking power of the engine when going downhill with a heavy load can prevent a runaway tractor and overturn. By stopping and shifting to a low gear before starting downhill you will maintain good control. A rule of thumb is to use the same gear to go down a hill that you would use to pull the load uphill. Also, use a tractor large enough and with adequate braking power to control the load being pulled. If the load you are towing exceeds the weight of the towing tractor, the wagon should have independent brakes.

Case History: A farm tractor was pulling a load of hay down a steep grade. After travelling approximately 85 metres down the slope, the driver prepared to turn right. The tractor veered sharply to the right and overturned, pinning the operator.

Space Wheels as Far Apart as Possible

Spacing the wheels of the tractor as far apart as practical is one of the most effective ways of increasing base line stability and reducing side overturns.

Hitching Implements Properly

People have been killed or seriously injured during hitching operations. Observe the following points while hitching your tractor to wagons or implements:

- Make sure that the area is clear and no one is behind the tractor
- Back the tractor up slowly to the implement
- Stop and apply the emergency brake
- Put the transmission in neutral
- Dismount the tractor and hitch up

If you have someone assisting you in hitching an implement:

- make sure your helper stands clear while you back up the tractor
- back up a little more than necessary and stop the tractor
- put the tractor in a forward gear, then allow the helper behind it
- inch the tractor forward while your assistant drops in the draw pin

Remember: If the tractor is in forward gear, and you foot slips off the clutch, it can't run over the person assisting you.

Take Special Care on Rough Terrain

Drive around ditches and steep slopes when possible. Forward movement up a steep slope can cause a rear overturn because the center of gravity of the tractor is higher and moves toward the rear of the tractor. Backing up a steep hill or out of a ditch helps maintain stability and can save you from an overturn.

Crossing slopes also can be dangerous. The operator should be alert for dips and raises that could trigger an overturn. If the tractor becomes unstable while operating on a slope, avoid an overturn and regain stability by turning down grade.

Some farms may have other 'obstacles' to contend with such as small bridges over creeks or paths over

railway lines. Small bridges should be constructed in such a way that they are capable of handling the weight of your tractor and whatever implements and load you are towing. The bridge you construct should also have bullrails (boards along the edges) to prevent the tractor wheels going off the side. Make sure the bridge is wide enough and always try to approach it straight on when possible, lining up trailing equipment.

ROLLOVER PROTECTIVE STRUCTURES

Most tractors sold today in Ontario come equipped with **Rollover Protective Structures (ROPS)** and **seatbelts**. ROPS have been around for about thirty years and have saved many lives in rollover situations that could have ended in tragedy. Rollover protective structures are engineered for each specific tractor and must meet national and international standards. The structure protects you by limiting a rear rollover to 90 degrees and when used in conjunction with the seatbelt, keeps you within a "frame of safety", preventing you from being tossed about the cab or from the tractor.

One should never drill holes into or alter the rollover frame in any way. Some people have been known to drill holes to mount radios etc. This practice is dangerous. The ROPS structure becomes weaker at that point and in the event of a rollover, it could cave-in or collapse, not offering total protection to the operator.

ROPS can be either a protective frame that is highly visible or built into a cab structure. Rollover protective structures are available for many older tractors as well. Check with your dealer or manufacturer to determine if one exists for your tractor. In recent years, many manufacturers have reduced the cost of ROPS or subsidized the installation of them.

TRACTOR STABILITY

All tractor operators should be aware that a tractor is sensitive to any shift of its centre or gravity or balancing point. This is the point around which all tractor weight balances and is found on most tractors just ahead of the operator's seat and just above the height of the rear axle. Different forces and practices can cause the stability of the tractor to change.

These include:

Centrifugal force is a force that tends to resist a change in direction. If a tractor was travelling in a straight line then suddenly turned, there would be a tendency for the tractor to want to continue in that straight line. This is centrifugal force. By doubling the tractor's speed, the centrifugal force is increased four times.

Raising a load such as with a front end loader, also raises the centre of gravity, making the tractor less stable, or a little top heavy.

Heavy implements or loads mounted on the rear of the tractor will shift the centre of gravity further to the rear making it easier to flip backwards.

Crossing steep slopes can change the centre of gravity depending upon the angle of the slope.



FACT

FRONT-END LOADERS can change the stability of a tractor-loader combination when not operated properly.

SAFETY TIPS:

- Keep the bucket low while carrying loads or when operating on inclines.

USING FRONT-END LOADERS WITH THE TRACTOR

Front-end loaders are used in the agricultural and landscape industries to handle many types of material from feed and manure to soil and gravel. The versatility of loaders allows an operator to load, lift, transport and handle materials with great ease. Like other mechanical devices, safety lies with the operator and his knowledge of what the machine can and cannot do. A heavy load raised too high can change the centre of gravity and the stability of the tractor-loader combination. This can lead to situations where the tractor can tip over. There are a number of rules that an operator can follow to prevent such accidents from occurring:

Keep the loader bucket low while transporting loads. As mentioned above, a raised bucket can change the centre of gravity of the tractor. Obstacles on the travelling surface such as rocks, boards, or holes in the ground could lead to a quick upset if the load is carried too high. Avoid travelling downhill with loaded buckets.

Restrict your speed when travelling with a load. Remember, keep it low, travel slow. The added load which you carry in the bucket adds to the momentum of the tractor. If you were moving at a high speed and decided to turn it could flip you over.

Keep your load even in the bucket. An uneven load could lead to dangerous situations. Your loader can only handle so much weight and you don't want to put undue stress on the various components. Check your operator's manual for the loader's capacity.

Ballast will help give you stability. Extra ballast will help counter-balance the extra weight at the front of your tractor and reduce rollover potential.

When not in use, remove your loader from the tractor. Having the loader always attached while trying to perform other duties with the tractor can make some situations complicated and lead to poor visibility and added fuel costs.

Don't misuse your loader. The loader bucket was not meant to be used as a work platform for people. Hydraulics can fail leading to tragedy.

When leaving your tractor-loader alone, lower the bucket to the ground. This is so that it cannot accidentally be lowered by children or others.

Handling large round bales: A number of operators have been injured when improperly secured bales rolled down the arms of the front-end tractor loaders. Proper restraining devices should be used to prevent the bales from coming loose. A manufactured bale spear, specifically for this purpose is ideal.

Loader Safety Tips

Remember:

.Never work or walk under a raised loader.

.Watch for overhead electrical wires and other

obstacles when raising loaders.

.Be careful near banks and slopes. Added weight can cause them to collapse.

.Don't move or swing loads when people are working in the area.

.Never allow anyone to pass under a raised bucket.

.Keep the work area as flat as possible.

.Match the proper bucket to the job you are doing.

Case History: The victim was driving a loader tractor along the shoulder of a road with the bucket raised. The tractor ran off the shoulder and rolled over into the ditch. The victim was pinned underneath the tractor.

HOW TO AVOID TRACTOR OVERTURNS

Tractor rollovers account for about half of fatal tractor accidents, and are responsible for many disabling injuries and considerable property damage. Overtuens often result from operator distraction.

Side Rollovers

Rollovers to the side are the most common type of rollover. There are a number of ways that this type of overturn can occur.



Driving across a steep slope: The greater the angle of the slope, the greater the danger will be of rollover. Your tractor was designed to distribute its weight around the centre of gravity of the vehicle. If you cross a slope with a very steep angle there may be more weight on the downward side of the centre of gravity and the tractor could simply flip over. This problem is compounded by the fact that you may encounter obstacles which will change your stability such as potholes on the downhill side or rocks and other obstacles on the uphill side. Your tractor may also have side-mounted implements on it. You should keep the side-mounted implements on the uphill side of the slope for added stability. Don't raise the implements or loader buckets. Keep them as low to the ground as possible. Avoid turning uphill. If stability becomes uncertain, turn downhill. This could prevent a rear rollover.

Driving too close to a ditch, culvert or pond can lead to the tractor rolling into the ditch if you get too close to the edge. A good rule of thumb is to stay as far away from the embankment as the ditch is deep. This keeps you behind the sheer line. The edge of a bank has little to hold it there and the weight of your tractor can cause the earth to shear away along this line, causing you to slide into the ditch.

Case History: The victim was cutting hay near the edge of an embankment. The tractor went over the edge and rolled on top of the victim, trapping the individual face down in approximately one foot of water.

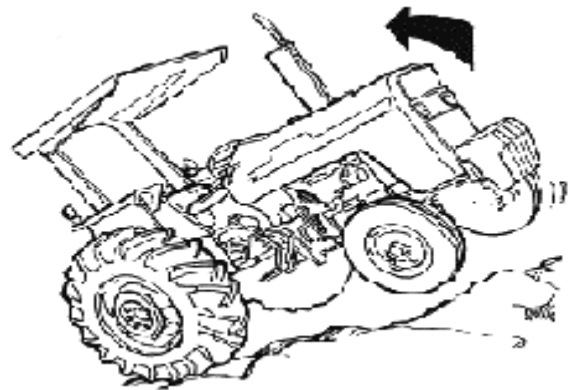
Turning while travelling too fast can result in a side rollover. As your vehicle travels faster it wants to continue on in the straight line in which you are heading. Without slowing down, if you make a sudden, quick turn, the weight of the tractor wants to keep going and causes it to flip over.

Driving with a front-end loader too high changes the centre of gravity of your tractor. It raises the centre of gravity, making it 'top heavy'. A sudden turn or raising the tractor on one side can cause a side rollover. The problem is compounded when the loader has material in it, especially if it is not evenly distributed.

Towing a load that is too heavy to control can cause jack-knifing.

Case History: The victim was driving a tractor and bale wagon down a 40 degree slope. The wagon jackknifed, causing the tractor to roll over and pin the driver.

Driving on roadways without locking rear brakes. If you do not lock your brake pedals together for travel on the roadway, should you need to apply them suddenly, you may only hit one pedal. If this occurs it could cause one wheel to lock up, leaving the other in motion. The result could cause you to swerve into the ditch or into oncoming traffic.



Rear Rollovers

Tractor rear rollovers are caused by:

Hitching too high is one of the main causes of rollovers to the rear with farm tractors. Loads should only be hitched to the drawbar. If a load is hitched above the drawbar and power is applied, the tractor may revolve around the rear axle. It only takes about 1.5 seconds for a tractor to flip backwards, not enough time often for the operator to react, let alone escape.

Case History: The victim was using a tractor to pull out small trees on a relative's farm. A chain was wrapped around the base of the tree, and the other end was hitched to the rear of the tractor. The hitch point was higher than the tractor's rear axle. When an attempt was made to pull out the tree, the tractor flipped over backward and crushed the victim.

Driving forward up a steep slope can be extremely dangerous, since the slope and the drawbar leverage act against you. The same problem occurs when a tractor is backing down

a slope. If brakes were suddenly applied while backing down a slope, the tractor could pivot around the rear axle, flipping over. Try to avoid backing down slopes or driving forward up a steep slope. The higher the slope and the greater your speed of travel will compound the problem. Sometimes while driving **across** slopes stability of your tractor becomes uncertain. If this occurs, turn the tractor downhill, **not uphill**. A sudden uphill turn could upset you.

Driving forward when stuck in mud or ice can be dangerous. If the tires are frozen to the ground or will not move, you could end up with a rear rollover when power is applied. If you get mired in mud, try backing your tractor out first. This will keep the front end down and reduce the risk of rollover. If the tractor does not become free, then you may need to tow it out. Make sure that the towing vehicle is heavy enough for the job and that the tow lines are hitched to the drawbar. The towing tractor **must** have a rollover protective structure on it.

An operator's chances of surviving an upset to the rear without injury are poor unless the tractor is equipped with rollover protection. In a backward tip, the tractor hood can hit the ground less than 1-1/2 seconds after the front wheels begin rising. Once the wheels begin to rise, the operator has less than three-quarters of a second to realize what is happening and to take preventive action. Frequently the tractor is past the critical point of no return before the operator can do anything to keep it from falling on himself or others.

The danger of rear rollover is especially significant when the tractor is towing or pulling a load with a chain or tow rope. As well as the possibility of a rollover occurring, there is danger in using tow ropes or cables. These items store energy by stretching under load. By jerking the rope or cable or making a running start to move a heavy stationary load can stress a nylon rope or cable to the breaking point. If it snaps, it will act like a stretched rubber band and sling back at the tractor. It could smash a cab's windows or even decapitate and operator.

How can this type of fatality be prevented?

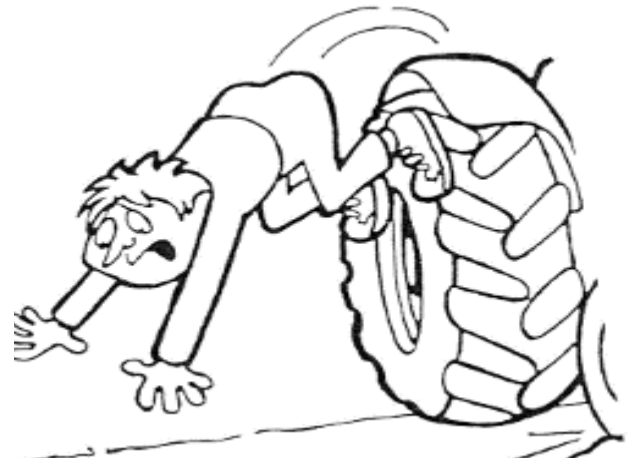
- Operator training and retraining

- Develop a safety awareness

Crush proof cabs or roll-bars. The margin of safety can also be increased by using seatbelts in conjunction with roll-bars.

Not all cabs presently being sold for tractors are crush proof; check and make sure that a cab is crush proof (R.O.P.S.) and meets A.S.A.E. standards.

Most major tractor companies have a low cost retrofit roll-bar. The price for a roll-bar is insignificant when measured in terms of saving lives, or the pain and suffering resulting from serious injury.



FALLS FROM TRACTORS

Falling from tractors is a common cause of serious injury and death. Falls are needless and preventable accidents. Falls occur from moving and parked tractors. Let's explore some methods for preventing these accidents.

Mounting and Dismounting

1. **Keep the steps and platform clean and dry.** Take time to clean off any debris, snow, ice, grease, and other items that accumulate on the platform and steps.
2. **Never jump from the tractor.** There have been instances where children and adults have leaped from tractors only to have clothing, scarves, laces etc catch on levers or other protruding parts. Some of these leaps have also ended in twisted ankles or broken bones.
3. **Use handrails, handholds, and steps to get up to the operator's platform.** Use three

point contact method to mount the machine at all times - either two hands and one foot, or two feet and one hand. Make sure you boots have non-slip soles.

Before mounting power-steered, four-wheel-drive tractors that hinge in the middle of the tractor chassis, make sure that all people are clear of the tractor. When mounting, avoid moving or pulling the steering wheel. These precautions can prevent a bystander from being crushed or struck by the tires, chassis, or mounted implements which may swing when the steering wheel is turned.

Operator Falls

Operators sometimes fall from tractors and are crushed under the wheels or mangled by trailing equipment. The following safety practices can help prevent such injuries:

1. Operate the tractor from the operator's platform only. Fasten the seat belt if your tractor is equipped with a protective frame or enclosure. If you get tired of sitting, stop and take a break. Don't start the tractor engine or try to operate controls while standing beside the tractor. Always sit in the tractor seat when starting or operating controls. There have been fatalities and serious injuries to people who attempted to start the tractor while standing next to it. In some of these cases, accidental contact with the gear shift lever cause the tractors to lurch forward, crushing the victims.

Never operate the tractor while riding on the draw bar, sitting on the fender, standing on the steps, or sitting on the backrest of the operator's seat. **Do not attempt to get on or off of the tractor while it is in motion.** Although a tractor may appear to be moving slow enough to jump on or off, a slip can leave you crushed under the wheels before the operator can react.

2. Maintain safe operating speeds. Never drive so fast that the front wheels of the tractor bounce. Watch ahead for obstructions and avoid them. Slow down before making turns. Always watch where you are going, particularly when there may be obstacles such as tree limbs, ditches etc. Speed and obstacles don't mix well.

3. Rest when you are tired. Stop the tractor

and lie down for a short nap if you feel tired or sleepy. Stop for 10 or 15 minutes every 2 to 2-1/2 hours. Don't drive when you feel like dozing. In this condition you are not alert enough to operate a tractor. Fatigue has been blamed for many tractor related fatalities in Ontario. Statistics show that many of the fatalities and injury accidents occur after the operator has been working with the machine for several hours without breaks. A person is not as alert after a long day compared to starting fresh in the morning.

NO RIDERS

Tractors are designed to carry one person, the operator. The proper place to ride is sitting in the operator's seat.

You will often be tempted to use your tractor to transport a helper. Children often plead for rides. **Do not give in.** An unexpected bump or turn could toss an extra rider right out the cab door and off the tractor. Your passenger cannot anticipate every tractor movement and brace against it. Furthermore, all the vibration and bumps are transmitted to the passenger. He can easily lose his grip and fall off.

Passengers can cause other problems, too. They can interfere with your operation of controls, they can accidentally move controls themselves, and they frequently distract the operator's attention.

Many people think an extra rider is safe in the cab of a tractor, but in an accident the extra rider may be tossed around, hit the door, and be thrown out.

Make exceptions to the 'no extra rider' rule only under these conditions: when a second seat is provided on the tractor or instructions are being given or received. There is potential danger for the instructor while training a new operator, but the training is essential. The danger can be minimized by driving at a slow speed and on level ground.

MAKE 'NO RIDERS' THE RULE - NOT THE EXCEPTION

Case History: The victim was riding on the fender of a tractor driven by their spouse. An attached rotary mower was cutting grass. As the tractor came close to a pine tree, branches knocked the victim off the tractor and into the path of the mower. The tractor could not be

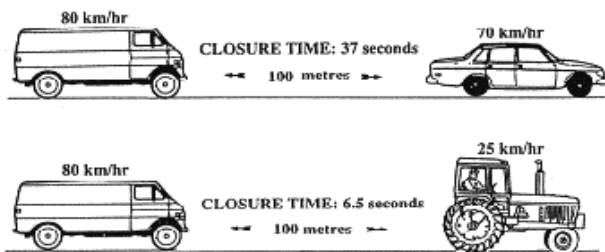
stopped in time, and the mower ran over the victim.

SAFETY WHEN OPERATING ON PUBLIC ROADWAYS



There are many accidents involving tractors and passenger vehicles on public roads each year in Ontario. Tractor road speed is much slower than automobiles, averaging about 30 km/hr. Tractor engine noise, power train noise and sound proof cabs do not allow the operator to hear approaching traffic. This means that the operator **must** depend upon vision to warn him/her of oncoming traffic.

One of the main reasons for tractor accidents is the



difference in speeds between cars and tractors. The closure time - that is the time it takes for one vehicle to overtake another - is much less for farm machinery than with automobiles.

The short closure time means the driver of a passenger vehicle has but a few seconds to identify the tractor and react accordingly. This is why positive identification of slow-moving vehicles is important. The accompanying diagram illustrates this situation.

HOW FAST CAN YOU REACT?

Before taking your tractor on the highway, you should ensure that it is prepared for such a trip and that your combination of vehicles conforms to the highway regulations where you will be operating.

Under the **ONTARIO HIGHWAY TRAFFIC ACT**, your farm tractor is not a motor vehicle but it is considered a **vehicle**. **Registration plates** are **not**

required for farm tractors, farm implements or self-propelled implements of husbandry when travelling from farm to farm for farming purposes, or places necessary for repair or maintenance. **Insurance coverage** for the above mentioned vehicles is usually included in the farm insurance policy.



Safe farm equipment road travel requires knowledge of traffic rules, maturity and common sense.

The **SLOW MOVING VEHICLE (SMV) SIGN** is used to warn other road users that the vehicle displaying the sign may be a vehicle travelling slower than the normal speed of traffic. Every farm tractor or self-propelled implement of husbandry, when operating on a highway, or any vehicle towed by either of them **must** have a slow moving vehicle sign attached to the rear, **except when directly crossing a highway**.

Always be seen! Remember that the SMV sign is for **your** safety.

- ☑ The sign must be displayed in the centre of the rear of the rear-most vehicle, between 0.6 metres and 2 metres above the roadway.
- ☑ It must be clearly visible for a distance of not less than 150 metres.
- ☑ The SMV colours deteriorate through exposure to the sun and weather. To ensure that the sign is clearly visible to other road users, it should be replaced when faded or damaged.

ROAD SAFETY TIPS:

Do a pre-trip inspection of all of your equipment. Make sure that it is in good mechanical condition.



As a driver of a vehicle, it is your responsibility, **by law, to clearly indicate all**

turns, slowing or stopping and to make certain that a turn can be made safely. If your equipment or load which you are towing does not allow other drivers to see your hand signals, then you should equip your vehicle with electrical or mechanical signals.

* Your visibility is vital at all times. Always use your lights when it is dark or visibility is poor. Many collisions occur due to the fact that other motorists do not see you in advance.

VEHICLE LIGHTING ON ROADWAYS

Lights are required in Ontario on a highway at any time from one-half hour before sunset to one-half hour after sunrise and at any other time when due to insufficient light or unfavourable weather conditions, persons and vehicles on a highway cannot be seen clearly at a distance of 150 metres.

A farm tractor or self-propelled implement of husbandry if fitted with an electric lighting system **must** display two white lights on the front of the vehicle and at least **one red light** on the rear of the vehicle. The lights must clearly be visible at a distance of 150 metres. If the vehicle is not equipped with electric lighting, a lamp or lamps should be placed on the left side of the vehicle with at least one white light to the front and one red light to the rear.

Case History: The victim was taking an orchard sprayer along a road. The tractor was illuminated with headlights plus a rear-mounted halogen working lamp. However, the sprayer wasn't fitted with either a lighting system or a slow moving vehicle sign. As a car approached from the rear, its driver assumed that the halogen working light was an oncoming vehicle. The driver moved the car towards the shoulder of the road because the light appeared to be crowding the centre line. The car struck the back of the sprayer, causing the tractor to roll over onto its roof. The victim was ejected from the tractor.

TOWING EQUIPMENT ON ROADWAYS WITH YOUR TRACTOR

The highway Traffic Act does not limit the number of wagons or trailers that may be towed by a farm tractor or self-propelled implement of husbandry.

The driver is responsible to ensure that the combination does not constitute a hazard. Each farm wagon or other implement of husbandry being towed must be connected to the towing vehicle by **two separate means of attachment. Also, each trailer or farm wagon must have two separate means of attachment to the vehicle ahead.** A safety chain's strength must be equal to the gross weight of the vehicle or vehicles being towed. This does not apply when towing a farm wagon or implement of husbandry directly across a highway.

DRIVER LICENCES

The driver of a farm tractor or self-propelled implement of husbandry is **not** required to hold a valid driver's license when driving on a highway, but **must** be at least 16 years of age. Under 16 year-olds are **only** allowed to drive a self-propelled implement of husbandry directly across a highway.



SEE THE LIGHT! BE SURE YOUR EQUIPMENT IS SAFE FOR HIGHWAY DRIVING!

POWER TAKEOFF SAFETY

Severe injury or death can result from accidents involving the power takeoff. There are two types. The most common is getting caught by the rotating shaft. On occasion, an operator is struck by a broken or disconnected shaft as it swings violently behind a tractor.

The PTO spins at speeds fast enough to wrap a person up in it before they know what happened. All it takes is a thread, shoestring, raveled jeans, or even long hair to get a person wrapped up in this powerful piece of machinery. A 540 rpm PTO shaft will rotate nine times in one second and travel 2.17 metres. This means that if a bootlace catches on the PTO shaft that in one second almost 2.17 metres of

lace will be wrapped up before you can even react! A 1000 rpm PTO shaft will rotate 16.7 times and travel four metres in one second!

Never remove shields from a PTO shaft. Even PTO shafts with guards are dangerous to step over. To be safe, walk around your equipment. The extra few seconds taken will help to insure you of more years of life.



An unguarded PTO shaft is dangerous. It can catch on your clothing before you realize it. If you're lucky, your clothes will tear, freeing you without serious injury. If you're not so lucky, you could be strangled or mutilated by the high-speed shaft.

Master shields help to prevent accidental contact with the tractor stub shaft and the front universal joint of the attached machine's driveline.

PTO shaft guards are provided for many tractors to completely enclose the tractor stub shaft when the PTO is not being used.

A PTO rolling shield completely encloses the PTO shaft. These shields are metal or plastic tubes supported on bearings so the shields rotate independently of the shaft. When the PTO shaft is turning, they rotate with it. But if a person contacts the shield, the rotating shield stops while the shaft inside continues to spin.



To prevent injury from entanglement with the

power take-off shaft, follow these safety rules:

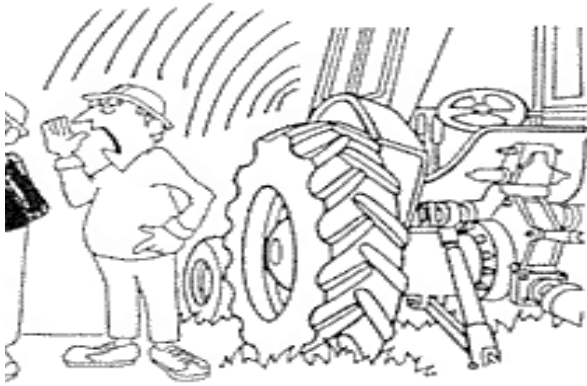
1. Always disengage the PTO, shut off engine and take the key before getting off the tractor. You can't be injured by the PTO or other machine parts if the driveline isn't rotating
2. Keep the master shield in position. IF damaged or removed during repairs - make sure it is replaced.
3. Make sure PTO shields are in good condition. They should rotate freely by hand when the machine is stopped. Damaged shields should be repaired or replaced.
4. Never step across a rotating power shaft, always walk around the machine. Safety devices are usually reliable - but malfunctions can occur. Do not take chances.
5. Keep the universal joints in phase when connecting the PTO shaft. This means keeping the end yokes in the same plane.
6. Always use the correct size drive line for the machine being powered. Also watch the correct PTO speed for the machine being used.

NOISE FROM TRACTORS AND MACHINERY

We have come a long way in recent years in reducing the amount of noise produced by farm tractors and machinery that they operate. New cab designs allow for great reductions in harmful noise levels produced by engines. Not everyone, however, has a new tractor to work with. hearing test performed on Ontario farmers exposed to years of tractor noise and other equipment show significant hearing loss in many individuals.

The measurement of sound or noise is related to pressure, frequency and duration, and is commonly measured in units called decibels.

With continual exposure to excessive noise, the ability to hear normal conversation is impaired.



Noise is too loud when:

1. **Your ears ring after prolonged exposure to noise.**
2. **Speech and other sounds seem muffled after exposure.**
3. **You lose the ability to tell musical tones apart.**
4. **You fail to hear high pitched sound.**

Continual exposure to noise at high decibel levels over a period of time may lead to permanent hearing loss. A tractor under load may produce noise levels of over 100 decibels. The recommended level of exposure for an 8 hour work period is 90 decibels. If you were operating a tractor at 100 decibels, the permissible daily exposure would only be **two hours!** At 115 decibels, the limit is only **15 minutes!**

If you do not have a cab that reduces noise significantly you may need to wear hearing protection in the form of ear plugs or muffs designed to block out harmful noise levels.

SAFETY IN TRACTOR OPERATION

Better tractor design means fewer hazards. Yet any machine can be dangerous if recommended operating procedures are ignored. A quick turn or one-wheel braking during high speed travel can tip a tractor sideways. Pop the clutch with a heavy load behind, and your machine could tip over backward. Failure to disengage the PTO before cleaning or

adjusting machinery could result in mutilation or death.

Safety practices begin with **YOU**. To be safe..... you need to think safe. Farming is one of the most hazardous occupations. Accident prevention requires a constant, conscious effort by those involved in farming. Here is a list of some things you can do to help prevent accidents:

No short cuts

Many accidents happen while trying to save a few seconds or a few steps. There are no short cuts to safety. Operate your equipment the safe way, the right way.

Take a break

Other accidents happen when a farmer is over tired. Long hours involved in a repetitive task, like driving a tractor down a long field, can be very fatiguing. Taking a short break will help keep your mind, and your muscles, more alert.

Reduce stress

Farming can be extremely stressful. It seems there are always deadlines to beat and never enough time to do a job right. People rarely work well under stress. Talking about your problems, planning ahead and remaining flexible will help to reduce stress and improve clear thinking.

Know your equipment

Be familiar with all equipment you operate. Also, instruct all drivers on the safe operation of farm machinery by going over the operator's manual. Know the equipment's potential and limits. Use the equipment as it was developed.

It's Up To You

Safe tractor operation involves consideration of many details. Your owner's manual contains the information you need to be a responsible, safe operator. Knowledge, skill and common sense are your weapons in the war against tractor accidents.



BEWARE OF CARBON MONOXIDE...
THE SILENT KILLER!

WHAT HAVE YOU LEARNED SO FAR?

TRACTOR SAFETY QUIZ

The correct answer for each of the following statements is TRUE or FALSE. Please make your selection.

- ___ 1. Refuelling an engine presents no danger of fire if it is shut off.
- ___ 2. To inspect for leaks in hydraulic lines, run your hands over the hoses.
- ___ 3. Hand holds are placed on tractors for extra riders.
- ___ 4. Always shut off the engine and apply the parking brake before dismounting the tractor.
- ___ 5. All PTO shafts should be guarded with the proper shielding.
- ___ 6. Tractors may be started safely only from the operator's seat.
- ___ 7. Noise levels of 100 decibels on a tractor are considered safe for an 8 hour exposure.
- ___ 8. When travelling, the front-end loader should be positioned high for good visibility.
- ___ 9. Weights help keep the front end of the tractor down.
- ___ 10. Proper training is essential for safe tractor operation.
- ___ 11. Tractor upsets are a leading cause of tractor fatalities.
- ___ 12. It is alright to drill holes in a ROPS frame to mount a CB radio.
- ___ 13. Hitch pins should always have proper safety catches to prevent accidental unhitching.
- ___ 14. When towing a load, go down the hill in the same gear as you would go up a hill.
- ___ 15. It is not necessary to use a seat belt when the ROPS is built into the cab.
- ___ 16. When driving your tractor on the roadway, you must have a slow-moving vehicle sign on the rear of your tractor.
- ___ 17. A tractor operator must be sixteen years of age to drive on the highway in Ontario.
- ___ 18. Be sure the highway is clear of traffic before pulling into it.

- ___19. When towing equipment on the highway, you must have a proper safety chain hook-up.
- ___20. When pulling a load up a slope, keep the hitch as high as possible.
- ___21. When stuck in the mud try to back out first.
- ___22. The position of a tractor's loader changes the centre of gravity as the position of the loader changes.
- ___23. Three is the **maximum** number of riders allowed on a tractor.
- ___24. If you are working with a tractor with rollover protection, always wear your seatbelt.
- ___25. Always read the operator's manual before operating a new tractor.
- ___26. A tractor can flip completely backwards in about 1.5 seconds.
- ___27. Do not make sharp turns at high speeds.
- ___28. If tractor stability becomes uncertain on a slope, turn downhill.
- ___29. In Ontario, you are required to signal your intention to turn when operating a tractor on a roadway.
- ___30. Check your tires and wheels for proper pressure and tread regularly.

ANSWERS TO QUIZ:

1. F 2. F 3. F 4. T 5. T 6. T 7. F 8. F 9. T 10. T 11. T 12. F 13. T 14. T 15. F 16. T 17. T 18. T 19. T 20. F 21. T 22. T 23. F 24. T 25. T 26. T 27. T 28. T 29. T 30. T

Here are the correct answers to the questions marked false:

1. Fuel spilling on a hot engine can catch fire. Let the engine cool down before refuelling.
2. Hydraulic fluid is under extreme pressure and can penetrate the skin. Use a piece of paper or cardboard to check for leaks. If there is a leak it will show on the cardboard.
3. There should **never** be any riders on a tractor, only the operator. Hand holds are used for easier mounting and dismounting.
7. If noise levels are greater than 90 decibels for an eight hour period, hearing protection must be worn to prevent hearing loss.
8. The front-end loader should be positioned no higher than the front axle; any higher position will change the centre of gravity and create a stability problem.
12. ROPS frames are engineered to withstand certain stress factors. Drilling holes or altering the design could weaken the structure and could result in failure.
15. When operating a tractor fitted with a ROPS frame, seat belts should be used at all times to keep you within the frame of safety in the event of a tractor flip.
20. All towed tractor loads should be hitched no higher than the drawbar.
23. There should **never be** any extra riders on a tractor, only the operator. Make "**No Riders**" the rule.

PRACTICAL EXPERIENCE **EXERCISE**

On the following pages are a tractor/wagon safety exercise designed for competitive use with Junior Farmers and 4-H groups in Ontario. The exercise needs a large area in which to practice. The accompanying map shows the dimensions of the field required. You will need some extra helpers to set up and act as judges to determine your "safety operating" behaviour. Good luck!

TRACTOR AND WAGON EXERCISE - Total Points: 400/300 for skill and safety plus 100 for time

(Time Limit: 20 minutes)

The following is a brief description of how the competition works:

The judge for this exercise will start recording the time by means of a stop watch, once he/she has handed the keys for the tractor to the contestant.

The contestant will then mount the tractor (in parking station). He/she must always remember to use the three point method whenever he/she mounts or dismounts from the tractor. He/she must never jump on or off the tractor.

The judge will look for any loose clothing on the contestant, such as open shirts, coats, untied shoe laces, etc. Once the contestant has mounted the tractor, he/she is to put his/her seat belt on. He/she will then start the tractor, having first checked to see if it is in the "park" position, and that the clutch has been disengaged.

Once the tractor is in motion, he/she will depress the brake pedal to check to see if the tractor has brakes. He/she will then proceed to the wagon station. The contestant must back the tractor up to the wagon, so that the draw bar is in the exact position for the contestant to swing the wagon tongue into position and freely drop the draw pin in. He/she will not be allowed to manually move the tractor or wagon to assist with the hook-up.

The contestant will hook-up the safety chains on the

wagon on to the tractor, remove the slow moving vehicle sign from the tractor and place it on the rear of the wagon. He/she will then remove the wheel blocks from the right hand rear wheel of the wagon, and place them on the wagon.

The contestant will then mount the tractor and proceed to enter the course as specified on the diagram layout. He/she must travel at a safe speed to allow him/her to manoeuvre between the five gates on the right hand side of the course. A predetermined amount of points will be deducted for each ball knocked off, and each stake knocked over. He/she will be allowed 40 feet at the end of the course to make his/her turn, to allow entry through the five gates on the left hand side, which are the same as those for the right hand side. On passing through the last gate on the left hand side, the contestant will drive the tractor into the wagon park station area, and directly through the two guide stakes, which allow for three feet of clearance on each side of the wagon. The front wheels of the tractor must be ahead of the front two guide stakes before he/she commences to back the wagon up to the wagon park position area.

For each consecutive attempt to back the tractor and wagon up to the parking station, points will be deducted. Because the back of the wagon will be covered with an 8' x 4' sheet of plywood, it may be necessary for the contestant to stop the tractor and get off to check to see just how close he/she is to the stakes at the rear of the wagon. He/she must also be careful not to cramp the wheels of the wagon, or points will be deducted.

The wagon must be in the centre of the parking station, and within 6" of the stakes at the rear of the wagon. For each inch that the wagon is off centre, and for each inch that the wagon is further away than 6" from the rear stakes, points will be deducted. The contestant must be very careful not to knock the ball off of the rear of the wagon, because he/she will lose in excess of 100 points if he/she does.

Once the wagon has been parked, the contestant will then take the blocks off the wagon and put them behind and in front of the rear wheel of the wagon. He/she will then proceed to unhook the wagon (safety chains and draw pin). The draw pin is

to be left in the tractor draw bar.

The contestant will then take the slow moving vehicle sign from the rear of the wagon and attach it to the tractor. He/she will then return the tractor to the parking station, by backing it up to the stake. He/she must remember to put the tractor in "park", and to take the keys out of the tractor and hand them to the judge. The stop watch will then be stopped, and the time recorded.

PERSONAL PROTECTIVE EQUIPMENT

Each contestant will be required to supply his/her own hard hat, leather gloves, hearing protection (ear muffs), and safety boots for this exercise. The safety boots must be in good shape and have steel toes.

EQUIPMENT

1 - tractor, complete with rollover protection and

TIME FACTOR FOR TRACTOR AND WAGON EXERCISE

Procedure for Scoring

10 minutes or less is a perfect score = 100 points

10 minutes, 1 second to 11 minutes = 80 points

11 minutes, 1 second to 12 minutes = 60 points

12 minutes, 1 second to 13 minutes = 50 points

13 minutes, 1 second to 14 minutes = 40 points

14 minutes, 1 second to 15 minutes = 30 points

15 minutes, 1 second to 16 minutes = 20 points

16 minutes, 1 second to 17 minutes = 10 points

17 minutes, 1 second to 20 minutes = 0 points

Failure to complete the above-mentioned exercise in a time limit of 20 minutes will mean the automatic disqualification of the contestant.

The time starts as soon as the contestant takes the keys from the clockman. The time ends as soon as the contestant hands the keys to the clockman, or walks away from the tractor without the keys.

seat belts.

1 - Wagon running gear complete with bolster. Flat bed is 16 to 18 feet long and 8 feet wide. Rear of the flat bed is to be covered with a 4 x 8 sheet of plywood.

The running gear is to be extended to 120 inches from the centre of the front axle to the centre of the rear axle.

The wagon bed is to be placed on the running gear so that the measurement from the front of the wagon to the front axle is approximately 33".

Space requirements for this exercise, approximately 210' x 80'.

Surface requirements - ideally, the competitions should be run on a paved surface.

TRACTOR AND WAGON EXERCISE (SAFETY FACTORS) SAFETY

Description of Penalty & Number of Points Lost	.	Indicate penalties with X	Total Demerit points
1. For each item of P.P.E. missing <u>deduct</u> .	20	.	20 x =
2. For loose clothing on contestant. Each offense <u>deduct</u> .	20	.	20 x =
3. Failure to use the 3 point method when mounting or dismounting (no jumping). each time <u>deduct</u> .	10	.	10 x =
4. Failing to put the tractor "in park" before starting or on dismounting from tractor. each time <u>deduct</u> <i>(If he has difficulty is getting the tractor in park, he must try for at least 10 seconds to get into park).</i>	10	.	10 x =
5. Failure to use and adjust seat belt before putting the tractor in motion. each time <u>deduct</u> .	20	.	20 x =
6. Failure to disengage the clutch before starting. each time <u>deduct</u> .	20	.	20 x =
7. Failure to lock brakes together before putting the tractor in motion. each time <u>deduct</u> .	20	.	20 x =
8. Failure to check the brakes for in the first 5' of travel. <u>deduct</u> .	20	.	20 x =
9. For excessive riding of clutch. <u>deduct</u> .	10	.	10 x =
10. Failure to operate the tractor at a safe speed <u>deduct</u> .	20	.	20 x =
11. Failure to properly fasten the safety chains <u>deduct</u> .	20	.	20 x =
12. Failure to properly fasten the SMV sign on rear of wagon <u>deduct</u> .	20	.	20 x =
13. failure to remove wheel block from wagon and place on wagon <u>deduct</u> .	20	.	20 x =
14. For cramping of wagon wheels, i.e. wheels skid or tractor wheels hit wagon frame. each time <u>deduct</u> .	20	.	20 x =
15. Failure to properly block wagon wheels	20	.	20 x =

before unhooking wagon <u>deduct</u> .			
16. Failure to remove keys from the tractor upon completion, before dismounting <u>deduct</u> .	20	.	20 x =

Total Demerit Points on Safety _____ Total Time to complete exercise : _____
 Total Points for time: _____
 Total points 150 (Perfect score) minus _____ { demerit points } = _____

TRACTOR AND WAGON EXERCISES (SKILL FACTOR) SLILL

Description of Penalty and Number of Points lost	.	Indicate each penalty with an (X)	Total Demerit Points
1. For each consecutive trial of moving the tractor for hook up to wagon <u>deduct</u>	5	.	5 x =
2. For manually moving wagon or tractor to assist with hook up <u>deduct</u>	50	.	50 x =
3. For each stake that is hit in the course in such a manner that it produces the following results: deduct as follows: Each ball knocked off <u>deduct</u> Each time the top of the stake is moved approx. 6" or more <u>deduct</u> For each stake knocked over <u>deduct</u>	5 15 10	.	5 x = 15 x = 10 x =
4. For each consecutive trial of moving tractor and wagon ahead to line up in parking station <u>deduct</u>	5	.	5 x =
5. For touching ant stake in wagon park <u>deduct</u> For knocking off a ball in the wagon parking station <u>deduct</u> For each stake is moved backwards approx. 6" or more <u>deduct</u> For each stake that is knocked over in the parking station <u>deduct</u>	20 50 50 50	.	20 x = 50 x = 50 x = 50 x =
6. If distance away from the loading dock is greater then 6". measure from furthest point. For each inch more then 6" <u>deduct</u>	5	.	5 x =
7. For each inch off center of loding dock. For each inch <u>deduct</u>	5	.	5 x =
8. When the draw bar is further away then 1 inch from the stake in the Tractor Park Station. For each inch <u>deduct</u> When the draw bar is completely off center in the Park Station <u>deduct</u>	10 20	.	10 x = 20 x =

9. For touching the stake in the Tractor Park station <u>deduct</u>	10		10 x =
For knocking off a ball in the Tractor Park Station <u>deduct</u>	20		20 x =
For moving the stake in the Tractor Park Station more than 1 foot at the top <u>deduct</u>	30		30 x =
For knocking the Tractor Park stake over <u>deduct</u>	50		50 x =
		TOTAL DEMERIT POINTS ON SKILL _____	
Perfect Score 150	Demerit Points on Safety _____	Demerit Points on Skill _____	GRAND TOTAL _____

OTHER VIDEO RESOURCES AVAILABLE

The Farm Safety Association maintains a video lending library in Guelph, Ontario. The following tractor safety videos are available from the Association by calling (519) 823-5600:

TRACTOR SAFETY

VT 042 "Accidents Are Seldom Accidents"

21 minutes - colour - 1974 Available on VHS

This video emphasizes the need for roll-over protection on tractors and also illustrates many safe operating procedures for tractors.

Produced by Massey-Ferguson, Great Britain.

VT 043 "Farm Tractor Safety"

11 minutes - colour - 1976 Available on VHS

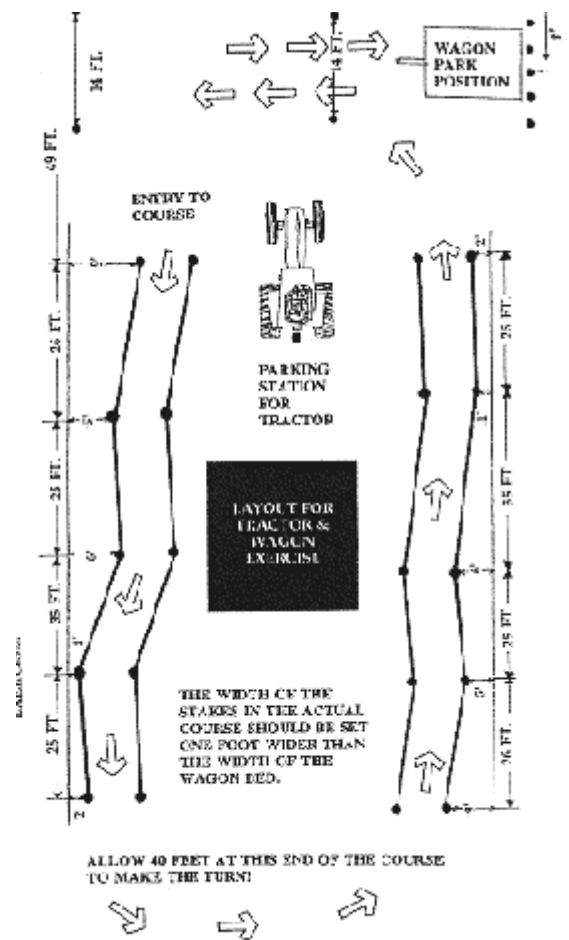
Devoted to the positive aspects of tractor safety, this video shows tractor overturn tests followed operator precautions to avoid side and rear overturns. Importance of ROPS is emphasized along with PTO safety, extra rider hazards, fuel handling safety, and safe highway transport.

Produced by International Harvester, U.S.A.

VT 093 "Horsepower"

9:45 minutes - 1989 Available in VHS only . This video looks at tractor safety and features farmers who have experienced accidents while operating their tractors.

Produced by the Nova Scotia Farm and Home Safety Committee





VT 115 "It Won't Happen To Me (Tractor Safety)"

Time: 16 minutes

The basics of tractor safety are covered using Farm Safety Association's fatalities as examples of what can go wrong and lead to fatal situations. Emergency medical personnel are also interviewed about tractor accidents.



Produced by New Holland, 1995

VT 126 "Nellie the Farm Safety Dog"

Time: Approximately 7 minutes

This true story is about a tractor rollover accident which occurred on a Southern Ontario tobacco farm. Nellie, the resident dog on the farm brought help to save the farmer's life. The rescue is recounted by those involved including police and ambulance drivers.

Produced by the Ontario Ministry of Agriculture, Food and Rural Affairs

S 028 "Safe Use of Farm Tractors"

65 slides - audio tape and transcript - 1982

Tractors by far are the most common type of machinery used on a farm. Tractor related accidents also cause the majority of farm-related fatalities. This slide set discusses the safe operation of farm tractors, with particular emphasis on tractor roll-overs.

Produced by Agricultural Extension Service, University of Minnesota.

VT 044 "Target You - Tractor Safety"

10 minutes - colour - 1979 Available in VHS

This video is largely animated and by means of the

principal character "Gotta-Go Joe", demonstrates many of the common accidents that a farmer can become involved in with his tractor, by trying to beat the clock.



Produced by John Deere Ltd.

VT 123 "Tractor Rollovers and ROPS"

Time: 6 minutes 30 seconds Available in VHS only

This video outlines the importance of having your tractor protected with a Rollover Protective Structure and covers ways that John Deere has made it easier to add this protection to your tractor.

Produced by John Deere

VT 051 "Tractor Safety"

21 minutes - colour 1977 Available in VHS only

This video covers all the basics of safe tractor operation. Produced by Perdue University.

VT 129 "Tractor Safety on the Farm"

Time: 11 minutes 30 seconds



This video covers the basics of tractor safety including the pre-operational check, starting and stopping; operation of the tractor including rollover situations; power takeoff safety and travel on public roadways.

Produced by the Farm Safety Association Inc, 1994

VT 092 "Tractor Tips"

17 minutes - colour 1990 Available in VHS only

Shows tractor operation and management techniques that reduce fuel consumption in field operations. Discusses safe ballasting, gearing up-throttle down and equipment matching.

Produced by Independent Study, University of

Guelph

VT 045 "Tractor Safety Begins With You"

20 minutes Available in VHS only

This video depicts a number of situations which led to tractor accidents happening involving extra riders, the P.T.O. and rollovers.

Produced by Kubota.

VT 101 "Tractor Safety Is No Accident"

15 minutes - colour - 1982 Available on VHS

A professional airline pilot who is also a farmer narrates this video on tractor safety. The narrator applies the same reasoning in operating tractors as he does with airplanes. A number of important areas are covered such as: the walk around check; tractor rollovers; transporting equipment; P.T.O. safety; extra riders; maintenance and service.

Produced by International Harvester, Chicago, Illinois, U.S.A.

VT 046 "Why Did Tommy Die?"

10 minutes - colour - 1980 Available on VHS

A number of young people are killed each year by tractors. Through the video's characters, John, Merriam and Tommy, the video explores the principle causes of tractor injuries and fatalities. The video demonstrates tractor fires, P.T.O. accidents, and tractor rollovers.

Produced by the Ontario Ministry of Agriculture and Food.

VT 047 "Within The Frame of Safety"

6 minutes - colour - 1969 Available on VHS

This video details the designing, testing and development of a protective frame for tractors. These structures when used in conjunction with seat belts, help prevent injuries due to side-rolls or back-flips.

Produced by International Harvester, U.S.A.

Farm Tractor Safety	yes	no	Target Date	Hazard Corrected {✓}
• Do you need the operator's manual for your farm tractor, and follow the operating, maintenance and safety recommendations found herein?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Before operating, do you work around the tractor making a visual check for bystanders and other objects?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Is the tractor equipped with a rollover protective structure (ROPS) and seatbelts?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Do you always wear seatbelts with ROPS?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Do you enforce the rule "NO RIDERS ON THE TRACTOR AT ANY TIME"?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Is there an SMV {slow moving vehicle} sign on the rear of the tractor or towed equipment for roadway travel?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Is the SMV sign clean, with good reflective qualities?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.

<ul style="list-style-type: none"> Do you lock brake pedals together before roadway travel? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> When towing equipment, do you use safety hitch pins and chains 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Is there a first-aid kit mounted on the tractor? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Is a fire extinguisher located on the tractor? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> When operating a tractor in buildings, do you open doors and windows or start ventilation fans? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Are steps free of mud, tools or debris that could cause slips? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Are keys removed from the tractor when not in use, to prevent theft or unauthorized people from using the equipment? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Do you always steer clear of hazards such as ditches, steep hills and other areas where tractors can tip? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> When using front-end loaders, do you travel with the bucket low to avoid tipping sideways? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Have all tractor operators on you farm received training on their equipment and reviewed the operator's manual? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Is mounted equipment always lowered before the operator leaves the tractor? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Do your tractor operators always do a pre-operational check which includes a walk round the equipment to check lights, visibility, tires, brakes, etc, 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Are towed loads always hitched to the draw bar, and never higher? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> When towing high loads, are clearances from overhead powerlines always checked? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Is the exhaust system on each tractor in good condition and leak-free? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> If the tractor does not have a sound-proof cab, does the operator always wear hearing protection? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
<ul style="list-style-type: none"> Are brakes adjusted regularly? 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.

PTO Driven Equipment

• Do all PTO's have shields and guards in place?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Is there a master shield in place where your PTO meets the tractor?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Are shields on PTO's checked periodically to ensure that they rotate freely? (check only with power off)	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Before leaving the tractor seat, is the PTO always disengaged, engine shut off and keys removed?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• When working with PTO driven equipment, is clothing closer-fitting, long hair covered, and no laces, etc., exposed	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Do you always avoid stepping over a PTO shaft?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.
• Are worn or defective parts replaced as soon as possible?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	.	.

