Health & Safety ONTARIO™
YOUR PARTNERS IN PREVENTION

AGRICULTURAL TRACTOR SAFETY

Tractors have contributed immensely to farm productivity and helped make it possible for farmers to feed not only themselves but also hundreds of others. Although today's tractors are safer than previous tractors, they are also larger and more technically advanced which creates new hazards. Tractors are involved in many farm incidents – accounting for approximately two-thirds of all fatalities. Over the years, manufacturers have added many safety features such as, roll over protection systems (ROPS), guards and master shields for the power take-off (PTO), traveling lights, enclosed and heated cabs, etc. However, all of these safety features do not replace a trained operator, aware of the potential hazards of operating a tractor safely.

Guidelines for safe tractor operation

Before starting the tractor

It is very important to be familiar with the tractor and know how to use it safely. This can be partly achieved by reviewing the safety precautions in the operator's manual regularly. Be sure to observe and follow the instructions contained on warning decals attached to your tractor. Before using the tractor, make sure it has been properly serviced and that all guarding is in place and working.

Do not wear loose clothing while operating a tractor – loose clothing can catch on moving parts and cause an accident. Before moving the tractor, make sure there is clear visibility from all sides and all lights are visible and working. If you are going to take the tractor onto the road, you must follow all traffic rules on open roads, including proper lighting, hand signals, right-of-way, etc. One of the most important things to remember is **never allow any riders on the tractor – except the driver!**

Training new operators

It is very important to train new and inexperienced operator by reviewing the operator's manual. Teach new operators to recognize hazards and know how to avoid them. Have the new tractor operator practice, without equipment attached, in a level field or a large, level yard. After the new operator has learned to operate the tractor alone in a level area, the next step is to attach and operate the equipment. The new operator should gradually work into the more complex jobs of tractor operation

Starting the tractor

- Perform a circle check of the tractor
- Adjust the tractor seat to the proper position for your body
- Fasten the seat belt and adjust the mirrors
- Ensure there are no obstructions in the tractor's intended path
- Place the gearshift in 'neutral' or 'park'
- Place all hydraulic controls in 'neutral'
- Disengage the PTO and apply the brakes; depress the clutch

**Reverse the last three directions when stopping the tractor*

Refueling

- Exercise caution when refueling tractors - there is always a risk of fire and explosion
- Never refuel the tractor while the engine is running or hot
- Always refuel the tractor outside
- Static electricity, a spark from the ignition system, or a hot exhaust could cause fuel to ignite
- Grounding the tractor with a ground wire or by dropping mounted equipment so it touches the ground can reduce static electricity
- Store your fuel outside – it is best to have fuel storage at least 40 feet from any building
- Keep the area free of weeds or any other combustible material
- Carry a first aid kit and an approved dry chemical fire extinguisher - tractors should have at least a five-pound extinguisher
- Be sure of good ventilation before starting the tractor engine

Operating large tractors safely

Giant four-wheel-drive tractors with articulated steering are now used on many farms. Though most safety recommendations apply to both large and small tractors, there are special safety concerns when operating super-sized tractors. The tractor's dimensions may cause difficulties in tight places, at corners and gates, and on narrow roadways. Overhead clearances, especially around power lines, may cause a problem.

The unique steering systems of large 4-wheel-drive tractors present new handling problems, especially for beginning drivers. All-wheel steering can shift a towed device into an unexpected path. Articulated steering changes the rig's center of gravity so that an overturn can occur under unexpected conditions. With articulated steering, high-speed road travel requires more operating skill than conventional tractor steering does.

Preventing Tractor Overturns

Tractors can overturn very easily, to the rear or to the side, when the centre of gravity is displaced outside of the base of stability.

The centre of gravity is the point of equal weight distribution. This means that 50% of the tractor's weight is distributed in front of this point and 50% behind. This applies from side to side and top to bottom as well. The centre of gravity will vary under different conditions.

The base of stability is the area inside where the tractor's wheels contact the ground. The base of stability varies depending on the front and rear wheel spacing, as well as the axle-to-axle spacing. Ensuring that the tractor is operated so that its center of gravity is within the base of stability will prevent the tractor from rolling over.

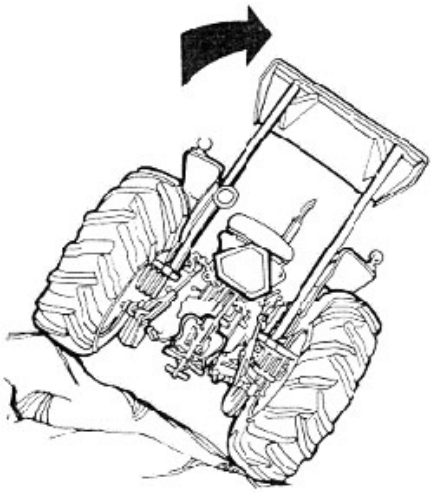
Using a front-end loader, having objects raised, and operating a tractor on a steep incline, are just a few of the possible causes for tractor overturns. As a best practice, avoid operating near ditches, embankments, and holes. If possible, keep away from steep slopes and reduce speed when turning, crossing slopes, and on rough, slick or muddy surfaces. If you need to turn on a slope, turn the tractor downhill. Shift the tractor into the lowest gear to prevent free-wheeling and/or excessive braking.

1 877 494 WSPS (9777) | 905 614 1400 | www.wsps.ca

Most tractors sold in Ontario come equipped with Rollover Protective Structures (ROPS) and seatbelts. ROPS protects the rider by limiting a rear rollover to 90 degrees – they do not prevent rollovers. When used with a seatbelt, the rider is prevented from being tossed inside the cab or from the tractor. Many older model tractors can be retro-fitted with a ROPS.

There are 2 ways of a tractor overturning, side rollovers and rear rollovers.

Side Rollovers

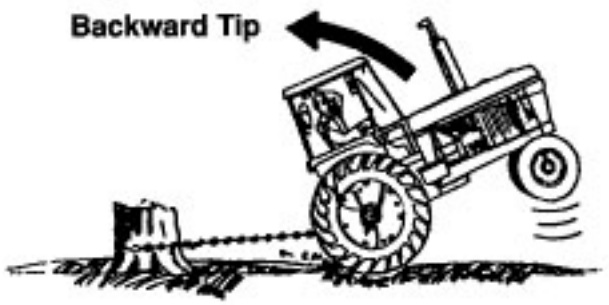


This is the most common type of tractor rollover. There are various ways this could occur.

1. **Driving across a steep slope**
   - Danger increases as the angle of the slope increases
   - Affects the centre of gravity
   - If your tractor has side-mounted implements on it, keep them on the uphill side of the slope for added stability; don't raise the implements or loader buckets
   - Avoid turning uphill and if stability becomes uncertain, turn downhill (this could also prevent a rear rollover)
2. **Driving too close to a ditch, culvert, or pond**
   - Getting too close to the edge can cause the tractor to roll into the ditch
   - A best practice is to stay back from the embankment the distance as the ditch is deep – this keeps you behind the sheer line
3. T**urning while traveling too fast**
   - The tractor wants to continue in the straight line it is heading as the speed increases
   - Making a sudden turn without slowing down, the weight of the tractor wants to keep going and could result in a flip over
4. **Driving with a front-end loader too high**
   - This raises the centre of gravity of the tractor, making the tractor top heavy
   - This issue is compounded if the loader has material in it (especially if it isn't evenly distributed)
5. **Driving on roads without locking rear brakes**
   - The brake pedals should be locked together when traveling on the road – this prevents only one pedal from being pressed
   - If only one pedal is used, one wheel will lock up and the other will still be in motion
   - This could cause the tractor to swerve off the road or into oncoming traffic

Rear Rollovers

Rear rollovers happen very quickly. The moment the wheels start to rise, the operator has less than three-quarters of a second to recognize what is happening and take preventive action. Frequently the tractor is past the critical point of no return before the operator can do anything to stop it from rolling over.



1 877 494 WSPS (9777) | 905 614 1400 | www.wsps.ca

1. **Hitching too high**
   - Never hitch to the axle or other high point
   - Hitch towed loads only to the drawbar and at the manufacturer's recommended height
   - When using the three-point hitch, add front weights, as necessary, to maintain stability and prevent steering problems
   - Use the proper safety clips, chains, and pins
   - Keep your hitches low and always keep the hitch on the drawbar - this can help prevent a tractor flipping over backwards
   - Tractors also can upset backwards when pushing objects, using a front-end loader, or when hitched to the front end by chains or cables that pass under the back axle
   - Keep the hitch as low as possible, preferably 17 inches above ground level – never get above 21 inches
2. **Driving forward up a steep slope**
   - The higher the slope and the greater the speed will compound the hazard
   - If the brakes are applied suddenly while backing down a slope, the tractor could pivot around the rear axle
   - Avoid backing down slopes
3. **Driving forward when stuck in mud or ice**
   - If the tires are stuck in the ground or will not move, a rollover could occur when power is applied
   - Always try backing your tractor out first – this will keep the front end down and reduce the risk of rollover
   - The tractor may need to be towed out

References

National Ag Safety Database

Ohio State University Extension

Texas Cooperative Extension: The Texas A&M University System

Virginia Tech, Environmental Health and Safety

Revised: June 2011