

Toolbox Talks

Agricultural tractor safety

Introduction

Farming has always been one of the most hazardous industries because of the number of hazardous activities farm workers perform. These activities include operating or working around agricultural tractors.

Today's tractors are much safer than they have been at any point in history, but some hazards can never be totally eliminated, especially when safety rules and precautions are not followed.

What is an "agricultural tractor"?

OSHA defines "agricultural tractor" as "a two or four-wheel drive type vehicle, or track vehicle, of more than 20 engine horsepower, designed to furnish the power to pull, carry, propel, or drive implements that are designed for agriculture. All self-propelled implements are excluded from this definition."

Hazards of agricultural tractors

Agricultural tractors have many significant hazards but some of the most serious hazards are

- Sideways rollovers. This may occur if the tractor is driven on a hillside that is too steep or too close to the edge of a roadside ditch or embankment; cornering too sharply or too fast; or the tractor's front-end loader

is elevated too high on a hillside or in a turn at excessive speeds.

- Rearward rollover. This may occur if the tractor is stuck in mud or snow preventing the rear wheels from rotating; the rear wheels cannot turn because the incline is too steep; the clutch is released too quickly with the transmission in a lower gear and the engine at a high speed; or the load is too heavy and/or hitched above the tractor's drawbar.
- Falls from tractor. This is the result of improperly mounting or dismounting or carrying passengers in/on tractors that are not designed for such use.
- Operators or others run over by the tractor. This is the result of people being in the line of travel; extra riders falling from steps, cab, or draw bar; limited visibility of small children or when backing the tractor toward machinery to be attached; or from by-pass starting.
- Operators caught between the tractor and another object. This may occur when the tractor is backing up to an implement to hook up.

Responsibilities/requirements of operators

If you operate an agricultural tractor you must:

- Be properly trained.

Toolbox Talks

- Be knowledgeable about the hazards and the steps you need to take to prevent accidents.
- Use the right tractor for the work at hand.
- Conduct required pre-operation checks.
- Know equipment blind spots.
- Preview the route for obstacles, holes, slopes, ditches, terrain, etc. and remove debris in the tractor's pathway.
- Operate the tractor and implements in accordance with the manufacturer's directions.
- Be continually aware of the operating area and environment.

Understanding the tractor and implements

Always read and follow the operator's manual and warning labels before operating. Never attempt to operate the tractor until you have read and understood these materials. If you have questions, ask your supervisor.

Proper service and maintenance of tractors

Be sure to check the tractor prior to each day's use. Most manufacturers can provide specific inspection checklists, but here are some general reminders:

- If the tractor has a Roll Over Protective Structure (ROPS), make sure it is secure and free of defects that may affect its strength, such as dents, corrosion, missing parts, unapproved modifications, etc. Make sure that foldable ROPS are locked in place.
- If a ROPS is present, a working seat belt must also be provided. Check the seat belt

webbing for tears, burns, holes, etc. Also be sure to check the seat belt's latch and anchorage. Make sure the seatbelt latches and unlatches properly.

- Check all fluids, such as oil, fuel, and water. Check the radiator level when the tractor is cold. If you must check it when hot, use extreme care.
- Look for excessive accumulations of dirt, mud, or manure that may build up on moving parts and cause entanglement hazards, or on hot parts and cause overheating or fire.
- Check for damage to ladders, catwalks, etc. that may lead to falls.
- Check all guards and covers on moving parts, especially the power take-off (PTO).
- Watch for any unusual odors, noises, behavior, performance, puddles or accumulations of liquids, etc.
- If the tractor has a cab, check filters to make sure they are in place and have not been modified. Also be sure to check for any damaged weather sealing or other openings in the cab that might allow contaminants (e.g., exhaust gases such as CO, pesticides) to enter.
- Check all ammonia or pesticide equipment for leaks, bulging hoses, dirty connections, etc. See the [anhydrous ammonia Toolbox Talk](#) for more details.
- Check to make sure that safety equipment, such as a 5 pound ABC fire extinguisher and first aid kit, is provided. Remember that ample supplies of clean water are required if ammonia is in use.

Toolbox Talks

Never refuel while the engine is running. Static electricity, a spark from the ignition system, or a hot exhaust can cause the fuel to ignite. To reduce the static electricity problem, ground the tractor with a ground wire or by dropping mounted equipment so it contacts the ground.

Always fuel your tractor outside and store your fuel outside. Store fuel at least 40 feet from any building. Keep the area free of weeds or other burnable material.

Preventing rollover accidents

The most common cause of tractor-related fatalities is crushing of the operator when the tractor rolls over sideways or rearwards. The operator may be ejected from the seat to the ground, where the tractor rolls over onto him or her.

Nearly all of these fatalities can be prevented by following a few very simple rules:

- Most agricultural tractors manufactured after October 25, 1976 must have a Roll Over Protective Structure (ROPS). See 1928.51(b)(5) for exceptions. If the tractor has an approved ROPS, **ALWAYS WEAR YOUR SEATBELT!** If the tractor does not have an approved ROPS, do not wear the seatbelt.
- Where possible, avoid operating the tractor near ditches, embankments, and holes.
- Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces. Doubling the speed of a farm tractor quadruples the danger of upsetting sideways.
- Always keep the tractor's center of gravity as low as possible. Implements such as loaders must be carried as low as possible. An elevated center of gravity makes the tractor much less stable, and much more likely to roll over.
- If you must elevate loaders or other implements, raise them only as high as necessary and only keep them raised for as short a time as possible. Be alert for ditches, rocks or holes that might cause the tractor to overturn.
- If the tractor becomes stuck in mud or snow, use another tractor to pull it out.
- Keep wheels spread wide whenever possible. A tractor will overturn sideways much more easily if the wheels are close together. When wheels must be moved in for narrow row farming, use extra caution, especially when traveling at higher speeds on roads.
- Stay off slopes too steep for safe operation.
- Watch where you are going, especially at row ends, on roads, and around trees.
- Operate the tractor smoothly—no jerky turns, starts, or stops.
- If your tractor has a foldable ROPS, fold it down only when absolutely necessary and fold it up and lock it again as soon as possible. Do not wear the seat belt when the ROPS is folded.

Toolbox Talks

Power Take Off (PTO) and other moving parts

Another common cause of tractor accidents and fatalities is contact with moving parts, especially the power take off (PTO).

Always check to make sure the PTO and other moving parts are properly guarded. **NEVER USE A TRACTOR IF THE PTO IS UNGUARDED, OR IF THE GUARD IS DEFECTIVE!**

Do not wear jewelry or loose clothing, or allow hair to hang loosely. Loose clothing, hair, and jewelry can get entangled with the shaft, U-joints, belts, or other rotating/moving devices and cause serious injury.

Keep the tractor and all moving parts clean, so that accumulations of manure or mud do not project from rotating parts. This debris can catch clothing or hair, and create an entanglement hazard.

Switch off the engine, set engine brake, and wait for the tractor and PTO implements to come to a complete stop before dismounting the tractor. Don't leave a running tractor unattended!

Stay away from the PTO drive line until all parts have fully ceased rotating. Do not lean over, step across, or crawl under the shaft. Do not unplug or adjust any PTO-powered machinery while it is in operation.

Falling off of tractors and/or running over employees

Ground workers, passengers, or even the operator may be hurt or killed when they are run over by moving tractors.

Tractors are not made for riders. NEVER allow anyone to ride on any part of the tractor unless the tractor is specifically designed for such use.

Keep people and animals away from the tractor. Always be aware of any ground workers or other people in the area. Make sure you maintain appropriate communication. Avoid distractions while driving. Texting, cell phone use, etc. is prohibited.

When mounting or dismounting the tractor, always be sure to maintain three points of contact with the tractor (no jumping onto, or off of the tractor). When climbing ladders, always face the tractor. Be sure the tractor is not moving before mounting or dismounting.

"Bypass starting" is another common cause of this type of accident. This occurs when an operator starts the tractor by bypassing the tractor's normal starting system, thus defeating the safety features that prevent the tractor from starting when the operator is not in the seat. Most commonly, this happens when someone standing on the ground touches a screwdriver or other metal object to the starter contacts and starts the engine.

Another method of bypass starting occurs when someone pushes a "start" button from the ground.

Toolbox Talks

Any method of bypass starting is extremely dangerous. If the tractor is in gear, the employee may be run over and killed. This is even more likely if the tractor has a hydraulic clutch, because it will move suddenly due to the buildup of hydraulic pressure.

Tractors on the highway

To the extent possible, follow all rules of the road.

- Use headlights, flashing lights, or safety clearance flags.
- No tailgating. Always leave room to stop safely.
- Maintain a safe speed, considering the conditions. Pull over when needed to let normal traffic pass. Use extra caution when approaching intersections, turns, and curves.
- Slow-moving vehicle signs must be provided when tractors are operated on public roads.

Keep PTO in neutral. Secure attachments in the transportation position. Do not operate attachments while in transit.

Avoid sideways rollovers on the highway. Don't travel on shoulder soft-spots, or close to ditches or embankments.

Independent brakes must be locked together to avoid uneven braking in panic stop situations.

Watch for blind spots.

Carbon Monoxide

Be very careful about running the tractor where exhaust gases like carbon monoxide (CO) may build up to dangerous levels. CO buildup may occur in pole barns, sheds, shops, or even outdoors in some cases.

If the tractor is equipped with a cab, be sure that exhaust gases can't enter the cab and be allowed to build up. Never make modifications or changes to the tractors, exhaust system, filters, or weather sealing. If filters are provided, remember that they DO NOT protect against CO.

Avoiding crushing workers between tractor and other objects

Do not allow ground workers to enter the area between a tractor and its implement until the tractor is stopped and shifted into neutral, the brakes have been applied, and the PTO has completely stopped.

Hooking up implements

Never hitch to the axle or other high point. Always hitch to the drawbar, take up slack slowly, and never jerk on chains or cables. Broken parts of a chain can act like shrapnel, and a cable can cut the legs from under a person. Nylon ropes have killed tractor operators and bystanders when the rope broke away from an implement. The stored energy in the rope catapults the rope end into the victim.

Tractors also can upset backwards when pushing or using a front end loader, or when an implement is

Toolbox Talks

hitched to the front end by chains or cables that pass under the back axle. Keep the hitch as low as possible, preferably at 17 inches, and never above 21 inches.

Questions

If you have questions on this topic, please contact the Office of Occupational Health and Safety at (612) 626-5008 or uohs@umn.edu, or see the website at <http://www.ohs.umn.edu>.