

Safe Tractor Operations: Road Safety for Tractors and Farm Machinery¹

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Each year, incidents involving tractors and other farm machinery occur on public roads, causing deaths, injuries, and costly equipment damage. Collisions with other vehicles make up more than 70% of these incidents. Running off the road, overturning, striking a fixed object, or the operator falling off the equipment make up the remainder (Moore et al. 2024).

Many people assume that roadway collisions happen during bad weather or hazardous conditions. Studies have repeatedly shown that the majority of tractor-motor vehicle collisions occur on dry, straight roads in daylight (Gorucu et al. 2017).

Here are some practical tips that can help. Although most of these points may seem obvious, they are nonetheless important to review.

- Keep travel on public roads to a minimum.
- Travel on public roads when traffic is at a minimum and visibility is good.
- Avoid moving tractors and other farm equipment on public roads between sunset and sunrise when visibility is 500 feet or less or when rain makes roads hazardous.
- Consider using trailers to transport tractors and equipment to distant fields and other locations.
- Be thoroughly familiar with how to operate the tractor and any equipment being towed.
- Obey all traffic laws, including speed limits, traffic signals, and signs.
- Have slow-moving vehicle emblems (required for vehicles traveling 25 mph or less) and reflectors in place on all tractors and implements, and make sure that they are clean and in good condition. New technology has improved the visibility of the slow-moving vehicle emblem. The emblem is made of two materials: a fluorescent material for daytime visibility and a reflective outline for nighttime. In the past, slow-moving vehicle emblems tended to fade excessively. Emblems made with the new material are more expensive, but their longevity offsets the extra cost. Reflective tape is also useful to increase the visibility of your tractor and equipment. Experts recommend applying it to the front, back, and sides of equipment.
- Make sure that brake pedals are locked together and that brakes are adjusted for equal pedal movement. This helps ensure that the tractor will stop in a straight line.
- Because tractor brakes have limited holding power, use low gears whenever taking heavy loads up or down hills.
- Properly light tractors and equipment. Lighting should include turn signals, headlights, and taillights.

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- Check to see if all the lights are working and use them if there is any question about visibility.
- Keep flashing amber lights on when operating farm equipment on public roads.
- Turn off any work lights that face the rear. Make sure the load does not obscure lights and warning devices. If night driving is necessary, clean headlights and taillights.

Common Causes of Collisions

Nearly half of all collisions between motorists and farm implements involve one of two scenarios: the left-turn collision or the rear-end collision. The number of incidents involving each scenario is about the same (Gorucu et al. 2017; Moore et al. 2024).

Left-Turn Collision

THE SCENARIO

The left-turn collision occurs when the tractor is about to make a left turn at the same time that a motorist tries to pass.

WHY IT HAPPENS

Like tractor-trailer drivers, tractors sometimes need to make wide left turns. They may swing to the right before making a left turn because they need extra room to line up with a farm gate or driveway. This maneuver can confuse motorists, especially if they think that the tractor operator is moving over to let them pass. Tractor operators, especially when towing equipment, have limited visibility and may not see the motor vehicle.

HOW TO AVOID

Tractor operators can reduce the potential for the left-turn collision by installing extension mirrors on the tractor to improve visibility. A sticker that is often seen on semi-tractor-trailers is a good reminder to motorists: “If you can’t see my mirrors, I can’t see you.” This sticker can be placed on farm equipment to provide motorists with more information.

Rear-End Collision

THE SCENARIO

The rear-end collision happens because a motorist does not see the farm machinery in time.

WHY IT HAPPENS

It is easy to misjudge speed when approaching a slow-moving vehicle. In most cases, there are only a few seconds to react and slow down. For example, if a motorist is

driving 55 miles per hour and comes upon a tractor moving 15 miles per hour, it only takes five seconds to close a gap the length of a football field. Here is another way of looking at it: in a typical situation, a car is driving 50 miles per hour on a rural road. Up ahead, maybe 400 feet away, the driver can see a tractor. The tractor is moving at 20 miles per hour. If we work out the math, that gives the car driver about 10 seconds to avoid a rear-end collision. In those ten seconds, the motorist must recognize that a dangerous situation exists, determine the speed at which the tractor is moving, decide what action to take, and apply the brakes hard enough and long enough to avoid a collision.

HOW TO AVOID

Use marking and lighting to provide motorists with the information they need to recognize the hazard.

Sideswipe Collision

THE SCENARIO

When a motor vehicle meets or attempts to pass a farm vehicle, it is sideswiped by the tractor or towed equipment.

WHY IT HAPPENS

Some farm operators haul equipment that is particularly wide or long, but some motorists do not account for the width or length of the equipment or the sway of the tractor and implement. Additionally, equipment takes up more available roadway when approaching bridges, mailboxes, or other shoulder obstructions.

HOW TO AVOID

For oncoming and passing traffic to better assess the width of farm equipment, reflective tape and materials should be used to mark the extreme front and rear points of the machine.

Head-On Collision with Another Motor Vehicle

THE SCENARIO

While a motor vehicle is passing a farm vehicle, it is confronted by another motor vehicle approaching head-on. There is no time to get off the road, and a head-on collision occurs.

WHY IT HAPPENS

As in the sideswipe collision, a driver may fail to appreciate the length of the farm equipment and be forced to spend a longer time in the passing lane. Additionally, the driver’s view when preparing to pass may be blocked by the farm equipment.

HOW TO AVOID

Drivers should pass only if there is plenty of space to get around and ahead of the tractor.

Head-On Collision with Towed Equipment THE SCENARIO

An oncoming motorist collides head-on with a towed implement that is wider than the tractor.

WHY IT HAPPENS

Wide equipment poses a special hazard, especially at night, because oncoming traffic does not realize that the tractor is pulling equipment that extends across the centerline and into the opposite lane of traffic until it is too late to react.

HOW TO AVOID

Whenever possible, keep road travel of wide equipment to a minimum, especially at night. Equipment that is well-marked and well-lit will provide motorists with better information to help them react in time. Reflective materials should be used to mark the extreme front points of the machine.

Escort Vehicles

At times, tractors or the equipment they are pulling cross into the oncoming traffic lane, especially on narrow rural roads. In these situations, consider using an escort vehicle equipped with flashing yellow lights. Remember that equipment can obscure rear tractor lights.

Escort vehicles are required by state laws under certain conditions. Even if an escort vehicle is not required by law, it is good practice. For large equipment, the local police, sheriff, or highway patrol may provide this service. If you have any questions about an oversized vehicle, contact your Department of Transportation Permits Division. For Florida, additional requirements for escort vehicle type, marking, and lighting are specified in the [Florida Administrative Code \(F.A.C.\) Section 14-26 .012](#).

Additional Safety Resources Websites

- For more information about these and many other safety topics, contact your county's UF/IFAS Extension office, or visit the Florida Agricultural Safety and Health Program website at <https://abe.ufl.edu/agsafety/>.

- Consult *Tractor Fundamentals: Best Practices*, North American Guidelines for Children's Agricultural Tasks. For more information, contact the National Children's Center for Rural and Agricultural Health and Safety at <http://www.marshfieldresearch.org/nccrahs>.
- Consult the Outdoor Power Equipment Institute at <http://www.opei.org>.
- Consult the National Agricultural Safety Database at <http://www.nasdonline.org>.

Safety Standards

- "Hand Signals for Agriculture," ASAE Standard S351
- "Operator Controls on Agricultural Equipment," ASAE Standard S335.4
- "Roll-Over Protective Structures (ROPS) for Wheeled Agricultural Tractors," ASAE Standard S383.1
- "Symbols for Operator Controls on Agricultural Equipment," ASAE Standard S304.5
- "Roll-Over Protective Structures (ROPS)," Occupational Safety and Health Administration, OSHA Standard 1928.51

Safety Decals

- "No Riders" decals may be purchased from various tractor supply companies.

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