

# Tractor Rollover Prevention

Texas Department of Insurance  
Division of Workers' Compensation  
Safety Education and Training Programs

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## Goal

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This program provides information on tractor safety.

## Objective

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Tractor operators will understand the nine key procedures for safe tractor operation.

## Background

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Agriculture has been classified as one of the three most dangerous occupations in the United States. Tractor accidents are a major contributing cause of death.

The Rollover Protection Systems (ROPS) standard, 29 Code of Federal Regulations (CFR) 1928.51, requires that all tractors used in the farming industry have an approved ROPS.

Training in the nine areas of safe tractor operation is required by 29 CFR 1928 Appendix A. Training must be given at the time of initial assignment and repeated annually.

## Facts

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A significant number of tractor fatalities are due to rollovers every year. These overturns were caused by the following improper tractor operations:

- Sharp, high-speed turns using a single brake;
- Driving too close to embankments and ditches;
- Operating downhill on steep slopes with side-mounted equipment;
- Rapid engagement of the clutch at high engine speed;
- Hitching loads to the axle housing rather than to the drawbar.

A ROPS provides better protection for the operator in the event of a rollover. A ROPS is designed to limit the rollover to 90° and reduces fatalities.

New tractors, whether manufactured in the United States or imported, must be factory equipped with ROPS. All ROPS must pass the Department of Labor's requirements found in 29 CFR 1928 and 29 CFR 1926. The manufacturer must provide proof to the customer that the ROPS meets these requirements.

Any tractor manufactured after 1983 must comply with the design standards for ROPS required by the Occupational Safety

and Health Administration (OSHA) and the American Society of Agricultural Engineers.

## Retrofitting

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Retrofitting older tractors with ROPS is possible but the cost can exceed the machine's actual value. Contact your local tractor dealer or the Texas Agriculture Extension Services for assistance with retrofitting information.

Farm operators should not add their own rollover protection devices to tractors as these devices offer a false sense of security.

## Safe Operation

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The ROPS structure is designed to take the total impact of an upset and protect the operator. A ROPS will not prevent a rollover.

Read the operator's manual before operating the tractor. Know your equipment and how it handles. Practicing the following nine procedures will lessen the chance of a fatality or serious injury caused by an overturn.

## Fasten Seat Belt Securely

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If the tractor is equipped with a ROPS, a seat belt will keep the operator from being thrown, crushed or receiving a severe injury if an upset occurs.

If the tractor does not have a ROPS, seat belts should not be worn. In the event of a rollover the operator may be thrown clear if they are not wearing a seat belt.

## Avoid Steep Slopes

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A tractor's stability is greatly reduced on steep slopes. Increase stability by choosing the widest wheel setting appropriate to the job.

Drive slowly and avoid quick uphill turns. Watch out for bumps on the uphill side. Keep side-mounted equipment on the uphill side.

Watch out for holes and depressions on the downhill side. Keep the tractor in gear when going downhill, allowing the tractor's engine to serve as a brake. Select the lowest gear and shift before you start downhill.

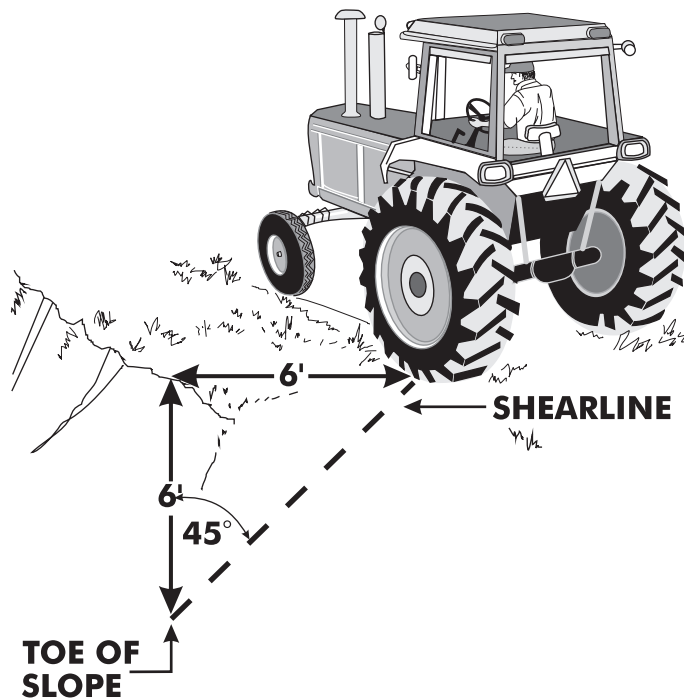
## Reduce Speed

When turning, crossing slopes, or on rough, slick or muddy surfaces reduce speed. The danger of an upset while turning increases by 200% when the tractor speed doubles.

Tractors equipped with front-end loaders should be kept as low as possible when turning. A raised front-end loader is more likely to cause a rollover when making a turn.

## Operations to Avoid

When possible, avoid operating a tractor near ditches, embankments and large holes. If you must operate near a ditch or riverbank, keep as far from the edge of the ditch as the depth from the top to the bottom of the ditch. For example, if the



ditch is 6 feet deep, keep tractor operations at least 6 feet from the edge of the ditch.

To operate safely on loose soils like sand or shale, increase the distance from the edge of the ditch.

## Rules and Regulations

Observe all motor vehicle rules and regulations. One third of all tractor accidents take place on public roadways. Be a courteous driver at all times. If traffic builds up behind you, find a clear place to pull over and allow traffic to pass.

A slow-moving vehicle (SMV) emblem must be displayed on the back of all tractors operating on Texas highways. The SMV emblem must be visible for a minimum of 500 ft. Attach the SMV emblem to the rear of towed equipment if it obscures the rear of the tractor.

Tractors operating at night require two white front lights and one steady burning, red rear light. Lights must be visible at a minimum of 500 ft.

## Operate Tractors Smoothly

Engage the tractor's clutch slowly and evenly. Engaging the clutch suddenly or quickly shifting gears can cause a tractor to flip over backward.

Slow down before stopping or turning when towing equipment. Sudden high-speed braking can cause the equipment to jackknife or roll over. Turn safely by reducing engine speed, applying both brakes if needed, and make a wide turn and allow the engine's power to pull the load.

When turning a tractor in a field, watch out for fences, trees, ditches or other obstructions. Apply a single brake, at a very slow speed, in the direction of the turn. Quick, short, brake-assisted turns can cause a rollover.

## No Riders

Do not allow others to ride on the tractor. Tractors are designed for one operator and no passengers.

## Hitching

Hitch to the drawbar, hitch points, or other locations as recommended by the manufacturer. Hitch as low as possible as hitching above the normal drawbar height may cause the tractor to tip over backward. Tractor hitches (drawbars) are designed to allow heavy loads to be pulled without risk of a backward upset. A safety hitch pin will keep towed equipment from disconnecting and detaching from the drawbar.

## Parking

Set the brake securely when stopped. If the tractor does not have a parking brake, shift the transmission lever into the park position. This locks the transmission and keeps the tractor stationary. Lower any raised equipment and remove the ignition key.

By following these nine procedures for safe tractor operation,

accidents and fatalities can be reduced.

## Review

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1. What is not a contributing factor in tractor overturns?
  - a. Turning too sharply.
  - b. Traveling on steep embankment.
  - c. Rapid engagement of clutch.
  - d. Traveling with your high beams on.
  
2. What action would reduce the chance of a tractor rollover?
  - a. Traveling at an excessive speed while cornering.
  - b. Striking a pothole, fence post, or tree.
  - c. Avoiding travel on steep slopes.
  - d. Driving without your hands.
  
3. When is it inappropriate to wear a seat belt?
  - a. When the tractor is not equipped with a ROPS.
  - b. When traveling less than 10 mph.
  - c. When traveling more than 10 mph.
  - d. While traversing a stream, creek, or river.
  
4. What is one of the precautions that should be taken when operating a tractor on a steep slope?
  - a. Placing any equipment on the downhill side.
  - b. Turning sharply towards the uphill side.
  - c. Avoiding bumps on the uphill side.
  - d. Hitting holes on the downhill side.

5. To be safe, how far must you operate your tractor from a ditch or embankment?
  - a. As far away as the ditch is deep.
  - b. 2 ft.
  - c. 6 ft.
  - d. No distance required.

## Answers:

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1, d; 2, c; 3, a; 4, c; 5, a

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## Resources

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The Texas Department of Insurance, Division of Workers' Compensation (TDI/DWC) Resource Center offers a workers' health and safety video tape library. Call (512) 804-4620 for more information or visit our web site at [www.tdi.state.tx.us](http://www.tdi.state.tx.us).

Disclaimer: Information contained in this training program is considered accurate at time of publication.

The Texas Department of Insurance,  
Division of Workers' Compensation (TDI/DWC)  
E-mail [resourcecenter@tdi.state.tx.us](mailto:resourcecenter@tdi.state.tx.us)  
or call 1-800-687-7080 for more information.

*Safety Violations Hotline*  
**1-800-452-9595**  
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