In 1999 about 780 people in the United States died in agricultural work accidents; nearly 130,000 suffered disabling injuries. The estimated cost of these accidents approached $4.5 billion.

No one deliberately has a tractor accident. Recent studies show that tractors accounted for two out of every five accidents.

Overturns have the highest fatality rate of tractor accidents occurring on the farm. To decrease this death rate, the U.S. Department of Labor established the Rollover Protective Structure Standard, more commonly known as the ROPS Standard.

The standard requires that all tractors manufactured after October 26, 1976, and used by employees must have rollover protective structures. It also requires that employees receive training in the nine areas of safe tractor operation outlined here. Such training shall be given at the time of initial assignment and at least annually thereafter. The purpose of this guide is to assist employers and employees in this training.

Farm employers should review this guide with anyone who operates a farm tractor.

Safe operation

The most important point of tractor safety is knowing your tractor. Know how the tractor handles and be alert to meet all potential emergencies. A good tractor operator has read the manual and practices these safety habits:

1. If the tractor has a rollover protective structure, securely fasten your seat belt.

   The seat belt is intended to hold you within the safety zone of the ROPS frame, or rollover protective structure, if an upset occurs. The belt is there so that you will not be thrown from the tractor and crushed or receive additional injury (Figure 1). The rollover protective structure is designed to take the total impact of upset and at the same time protect you, the operator.

   Don’t wear a seat belt if your tractor is not equipped with a protective structure. If you do, you lose your chance of being thrown clear of the tractor in case of an upset. Buckle up and stay inside.

2. Where possible, avoid operating the tractor near ditches, embankments and holes.

   Avoid holes and depressions that are likely to cause a sideways upset. Reduce speed to minimize the possibility of a sideways upset.

   To ensure safety around ditches and river embankments, just stay away. If you must operate near a ditch or riverbank, stay as far away from the ditch as it is deep (Figure 2). When operating around a ditch, look ahead for holes, gullies and washouts.

   Stay away from ditches and riverbanks where possible. If you can’t, look and think ahead.

3. Reduce speed when turning or crossing slopes and on rough, slick or muddy surfaces.

   Slow down before making any turn. Centrifugal force is one of the major causes of tractor upsets. The centrifugal force tries to keep the tractor going in a straight line (see Figure 3). As you double the speed of a tractor while turning, the danger of upsetting is increased four times.

   Reduce speed when turning with a loader. As you
turn with a raised loader, you increase the possibilities of a tractor overturn. Keep the loader as low as possible, and watch for ditches, holes and rocks that might cause an upset.

If a tractor begins to slide sideways in the direction of travel, you may tip over in a ditch or run into an obstacle and upset.

4. Stay off slopes too steep for safe operation.

Steep slopes greatly reduce a tractor’s stability. To increase stability, set the wheels at the widest setting suitable for the job you are doing. Drive slowly, avoid quick uphill turns, and watch out for holes and depressions on the downhill side and for bumps on the uphill side. If you are using side-mounted equipment, keep it on the uphill side of the tractor (see Figure 4).

Keep the tractor in gear when going downhill. This allows the tractor engine to serve as a brake. If in doubt about what gear to use, select the lowest-speed gear and shift before you start downhill.

Some tractors “freewheel” and provide no engine braking in certain speed ranges. If your tractor is one of these, travel downhill using those positions that provide engine brake action. Check your operator’s manual.

5. Watch where you are going, especially at row ends, on roads and around trees.

When coming to the row ends, slow the equipment down. Be alert to fence rows and make as wide a turn as possible. Apply a single brake in the direction of the turn. Only do this at a very slow speed. Quick, short, brake-assisted turns can cause upsets.

When operating on highways, tractor operators must follow all rules of the road. All tractors on Missouri highways from sunset to one-half hour before sunrise must have a Slow Moving Vehicle emblem. Occupational Safety and Health Administration (OSHA) regulations require any tractor operated by an employee to be equipped with a SMV emblem (see Figure 5).
Missouri law also requires a tractor to be equipped with at least one white light visible from 500 feet to the front and at least one red light visible 500 feet to the rear.

Follow these driving practices on the highway:

- Maintain control of equipment.
- Stay alert.
- Wait for traffic to clear before entering the highway.
- Beware of blind intersections.
- Keep the approaching traffic lane clear.
- Don’t allow traffic to build up.
- Use hand signals or turn signals.
- Obey all traffic signs.

6. Don’t permit others to ride.

Tractors are designed for only one operator and not passengers (Figure 6). Children often plead for rides, but don’t give in. If you must carry passengers, use a pickup or other automobile.

7. Operate the tractor smoothly — no jerky turns, starts or stops.

When starting tractor movement, make sure no people or obstructions are ahead or behind. As you begin to move, engage the clutch slowly and evenly. Engaging the clutch suddenly or quickly shifting a hydraulic transmission to high speed could tip the tractor over backward, especially when towing a load or starting up a slope.

Slow down before stopping or attempting to make a turn. Fishtailing or severe braking at high speeds can cause jackknifing and rollover (Figure 7). The safest procedure is to slow down by reducing engine speed before turning. Apply both brakes if braking action is required. Then turn as wide as you can with engine power pulling the load.

8. Hitch only to the drawbar and hitch points recommended by tractor manufacturers.

Hitching above the normal drawbar height may cause a tractor to tip over backward (see Figures 8A and 8B). Any time you are pulling a load with a tractor, the load is trying to pull the tractor over backward. The tractor is designed to pull itself, not the load. Hitching too high can increase the risk of a tractor tip over.

Drive on sound shoulders of main highways when traffic is heavy.
tor tries to pivot around the point where the rear wheels touch the ground.

The hitch on the tractor has been designed to allow you to pull heavy loads without the risk of a backward upset. When the hitch point on a tractor is raised, the chance for a backward upset is greatly increased. Always hitch to the drawbar and keep it as low as possible.

Always use a safety-hitch pin for fastening a pulled implement to the drawbar of a tractor. The safety pin will not bounce out, let the implement loose and possibly cause an accident.

9. When tractor is stopped, set brakes securely and use park lock if available.

If your tractor has a parking brake, use it. Don’t depend on leaving the transmission in one of the driving gears to keep your tractor from rolling (Figure 9). If your tractor doesn’t have a parking brake, then shift the transmission lever to the park position. This locks the transmission with positive action, keeping the tractor stationary. Make this a habit every time you leave the tractor seat: Shut off the tractor, set the parking brake or shift to park, and remove the key.

Daily maintenance check

Practicing the safety hints, reading the owner’s manual and performing the daily maintenance check will increase probability of operating a tractor safely. The daily maintenance check should include:

- Fuel supply — enough for the job.
- Radiator water level — within 1/2 to 1 inch of cap.
- Tire pressure — proper for work. Check operator’s manual.
- Check tires for cuts or breaks in the tread and sidewalls.
- Water level in battery — into opening. Use clean water.
- Transmission oil level — above add mark on dipstick. Check operator’s manual for type to add.
- Air cleaner — oil to mark. See operator’s manual.
- Check for loose parts, bolts and nuts.
- Make sure all shields are in place.
- Clean off platform of tools, mud, grease and any crop residue.
- Check all lighting equipment and SMV emblems.
- Check other items listed in operator’s manual at intervals stated.