Environmental Health and Safety Statement

Iowa State University strives to be a model for environmental, health and safety excellence in teaching, research, extension, and the management of its facilities. Faculty, staff and students are responsible for establishing and promoting practices that ensure safety, protect health and minimize the institution’s impact on the environment.

As an institution of higher learning, Iowa State University
- fosters an understanding of and a responsibility for the environment;
- encourages individuals to be knowledgeable about environmental, health and safety issues that affect their discipline;
- shares examples of superior environmental health and safety performance with peer institutions, the State of Iowa and the local community.

As a responsible steward of facilities and the environment, Iowa State University
- strives to provide and maintain safe working environments that minimize the risk of injury or illness for employees, students and the public;
- continuously improves operations, with the goal of meeting or exceeding authorized and applicable environmental, health and safety regulations, rules, policies, or voluntary standards;
- employs innovative strategies of waste minimization and pollution prevention to reduce the use of toxic substances, promote reuse, and encourage the purchase of renewable, recyclable and recycled materials.

It is the intent of this statement to promote environmental stewardship, protect health, and encourage safe work practices within the Iowa State University community.

Dr. Gregory L. Geoffroy
President
**Introduction**

**Why Does Tractor Safety Matter?**

According to the U.S. Department of Labor, farm tractor accidents cause more fatalities than any other type of accident on the farm. Accidents involving farm tractors result in about 270 deaths annually in the U.S., and account for 264,651 restricted workdays and 10,939 lost-time injuries each year.

![Graph showing tractor related fatalities](image)

Tractor Related Fatalities as displayed in the University of Iowa Tractor Risk Abatement and Control Conference report (1997).

Because of these overwhelming statistics, Environmental Health and Safety (EH&S) and Iowa State University want to ensure the safety of employees on university properties. Please read carefully the precautionary guides and contact EH&S if there are further questions.
Maintenance Precautions

• Please review your tractor operator’s manual for specific maintenance schedules and requirements.

• During the repair of any machinery, appropriate personal protective equipment (PPE) should be worn. (Helmets, goggles, gloves, hearing protection, and safety shoes.) Baggy clothing should be avoided, as it can more easily be caught in rotating machine areas.

• All machinery should be maintained regularly. Any worn or broken parts should be replaced immediately, or repaired according to manufacturer’s specifications.

• Make sure to replace any guards removed during equipment repair.

• Periodically check tire pressure to avoid flats and blowouts.

• Whenever preparing to work on a piece of equipment, wheels need to be blocked to prevent movement and any jacks used should be appropriate for the weight to be lifted, stable and in good condition.

• Brakes, hitches, safety chains, springs, and shackles should be inspected regularly for wear, broken or missing parts, cracked welds and excessive debris (mud, manure, rust).

• Hydraulic and air lines should be inspected for wear and cracks. Any indication of damage to these lines should be immediate grounds for replacement of the line. Caution should be taken when working on the hydraulic systems. Ensure all pressure in the system is relieved properly and that the fluid is cool before loosening any fittings or removing lines. *Use appropriate PPE when performing maintenance on hydraulic systems.*
• Scope out the terrain you will be traveling over during the work period. To prevent tractor roll-over, avoid driving on steep slopes, through ditches, on extremely rough ground, or over stumps and large rocks. Do not drive along the edge of streams or pits, and always seek an alternate route in dangerous areas. If a safety route is not available, proceed cautiously, at a slow speed. In addition, always keep the tractor in gear when traveling downhill.

• Never operate farm machinery under the influence of drugs or alcohol (this includes over-the-counter cold and flu medications and allergy medications).

• Anyone using a tractor should receive training on the safe operation of that equipment by a competent instructor before operating that piece of machinery.
Before Operating a Tractor, Continued

- Never allow additional passengers on a tractor, unless the tractor has been equipped with a factory “instructor seat.” This rule also goes for carrying passengers in loader buckets, and on the tongue between the tractor and the implement.

Example of incorrectly allowing a passenger to ride on a tractor. Unless equipped with an instructor seat, passengers are never allowed on a tractor. This photo is for demonstration purposes only.

- All bystanders should keep a safe distance from operating machinery.

- Whenever parking or leaving a piece of machinery for any length of time, even to check a malfunction, the engine should always be shut off, brakes engaged, the transmission in park-lock or in gear, keys removed, and any attachments disengaged and lowered to the ground.
• Personal protective equipment (PPE) should be worn at all times. Again, avoid loose fitting clothing, secure long hair in a bun, and remove jewelry before equipment use.

• All safety shields should be in place before operation (PTO master shield, belt shields, chain guards, etc.)

• All tractors should be equipped with roll-over protective structures (ROPS). Most new tractors are installed with ROPS, but not all tractor cabs are ROPS. Consult your tractor’s operator’s manual to determine if your cab is a ROPS; if it is not, a ROPS can be installed by a certified farm equipment dealer.

• If there is a risk of the tractor operator being struck by falling debris, a Falling Object Protective Structure (FOPS) should be installed (i.e. tractors with front end loaders).

• If a piece of equipment becomes clogged or jammed, never attempt to clean out the blockage until the machine is completely shut off and all moving parts come to a complete stop.

• Equipment being towed should be hitched directly to the draw bar with a hitch pin secured in place by a cotter pin. Do not tow
implements with chains, cables, or ropes. The draw-bar on a tractor should be kept as low as possible. Know the maximum height recommended by the tractor manufacturer and do not exceed this height. NEVER attach equipment to the tractor frame or axle.

- Seat belts should be worn at all times when the tractor has a ROPS. *Never wear a seatbelt in a tractor without a ROPS.* In the case of a roll-over, you will not be able to escape getting crushed by the machinery.

- Do not try to tow loads that are too heavy for the tractor. Too much towing weight can cause a tractor to become unstable and extremely difficult to control due to the “whipping” action of the load.

- All farm equipment traveling on any roadway should be equipped with an approved Slow Moving Vehicle (SMV) emblem. Emblems should be placed on all tractors and any implements that will be towed. Emblems should be clean and in serviceable condition. Broken, worn, or discolored emblems should be replaced. Emblems should be on the rear of the vehicle, in such a location that they are highly visible, and not obscured by the mechanical components of the implement.
• Obey all traffic laws when traveling on public roadways.

• Use hand signals during tractor operation, such as those developed by the American Society of Agricultural Engineers. This will insure effective communication in high noise situations. Included with this booklet is a quick reference ASE handsignal sheet that fits easily into compartments of tractors or jackets.

• Many tractor accidents involve excessive speed. Drive at speeds appropriate for 1) the job you are doing; 2) the terrain over which you are traveling; and 3) the piece(s) of equipment you are using. Always remember to slow down when making turns.

It is critical to always remember what you should and should not do around or in a tractor either before or during operation. There are points of hazard that are very important to keep in mind while working around large machinery and implements.
A guard may be any shield, cover, casing, or physical or electronic barrier, intended to prevent contact between a hazardous machine part and any part of a person’s clothing or anatomy.

It is key that the various guards are replaced after any cleaning or maintenance to prevent accidental injuries.
**Points of Hazard on Tractors**

**Pinch Points**

Belt drives, chain drives, gear drives, and feed rolls. When shields cannot be provided, operators must avoid contact with hands or clothing in pinch point areas. Never attempt to service or unclog a machine while it is operating or the engine is running.

![Danger Sign]

**Thrown Objects**

Any object that can become airborne because of moving parts. Examples include rocks, stones, sticks, and pieces of chopped or cut crops. Always keep shields in place, and wear PPE when working around equipment producing debris or this nature.

**Pull-In Points**

Points where objects are pulled in to equipment, usually for some type of processing. Examples include feed rolls, grinders, and forage harvesters. Never attempt to hand-feed materials into moving feed rollers. Always stop the equipment before attempting to remove an item that has plugged a roller or that has become wrapped around a rotating shaft.
Wrap Points

Rotating PTO and other shafts (e.g. joints, couplings, shaft ends and crank shafts). Watch components on rotating shafts, such as couplers, universal joints, keys, keyways, pins, or other fastening devices. Splined, square, and hexagonal shafts are usually more dangerous than round shafts because the edges tend to grab fingers or clothing more easily than a round shaft, but round shafts may not be smooth and can also grab quickly.

Crush Points

Points between two objects moving toward each other or one object moving toward a stationary object. Examples include four-wheel drive tractor with articulating steering which pivots in the middle, working under a raised heavy object like a combine head, hitches, telescoping shafts, hoods, and doors.
Shear Points

Where the edges of two moving parts move across one another or where a single sharp part moves with enough speed or force to cut soft material. Examples include sickle bar mowers, rotary shredders, and cutters, cutter heads of forage harvesters, augers in tubes, chain and paddle conveyors, and certain points in an implement frame during raising or lowering, and rotary mower blades.
Run-overs claim approximately 60 lives every year, and are the second leading cause of tractor-related death. Most run-overs occur when an operator or an extra rider (often a child) falls from and is run over by the tractor (50%). The next most common run-over event is to a bystander in the vicinity of the tractor (27%), often when the tractor starter is bypassed with a metal conductor and the tractor is started in gear.

Unseen bystanders and extra tractor occupants are included with run-over accidents. “Children under 15 account for almost 90 percent of all such fatalities,” according to National Institute of Occupational Safety and Health (NIOSH). Around 20% of agricultural deaths involve children or adolescents under the age of 18. At least 13% of all tractor-related fatalities occur on public highways.
According to the National Safety Council, tractor rollovers cause 52 percent of all fatal farm accidents. Nearly two out of every three tractors in the United States lack a ROPS, and tractors manufactured before 1973 are almost universally without ROPS. According to the National Agriculture Safety Database, the use of ROPS and a seat belt is estimated to be 99 percent effective in preventing death or serious injury in the event of tractor rollovers.

Note: Do not wear a seatbelt if your tractor is not equipped with a ROPS. In the event of a rollover, you may not be able to escape!
Additional Notes and Contact Numbers