

Chapter 1 – Farm Machinery and Equipment

Operating a Tractor

Tractors are the main cause of accidental deaths on farms. Over the years, many farmers, farm workers and others living on or visiting farms, have been killed or seriously injured falling from moving tractors, being run over by tractors, or being crushed when a tractor rolls sideways or backwards.

Spot the hazard

Regularly check for hazards relating to tractors, attached implements and field conditions. Hazard areas could include mechanical parts, operator training, other people, work procedures, unsafe jacking, climatic conditions, chemicals used, uneven terrain, and any other potential causes of an injury or a hazardous incident. Keep a record to ensure identified hazards are assessed and controlled.

Assess the risk

Once a potential hazard has been identified, assess the likelihood of an injury or hazardous incident occurring. For example, risk to children playing near a tractor will vary, depending on what the tractor operator is doing, how close they are to the tractor and whether the operator knows they are there. Consider ways of minimizing risk.

Make the changes

- Read and follow safety procedures in the manufacturer's manual.
- Ensure an approved cab or rollover protective structure (ROPS) is fitted.
- Fit and use a seatbelt on tractors with ROPS.
- If there is a risk from falling objects, fit a fall-on protective structure (FOPS).
- To reduce risk of back strain, fit a seat with side restraints and a backrest.
- Wear hearing protection, and remember, not all tractor cabs are sound proof.
- Keep children away from tractors and machinery.
- Remove starter keys when tractors are not in use.
- Have an up-to-date maintenance schedule.
- Follow safe maintenance and jacking procedures. (See Tractor Maintenance.)
- Ensure the operator is properly trained for each type of tractor work.
- Always mount and dismount on a tractor's left side - to avoid controls.
- Adjust the seat so all controls are safely and comfortably reached.

- Keep all guards in place, including the power take-off (PTO).
- Operate the self-starter from the operator position only.
- Never carry passengers.

When operating a tractor

- Drive at speeds slow enough to retain control over unexpected events.
- Reduce speed before turning or applying brakes.
- Watch out for ditches, logs, rocks, depressions and embankments.
- On steep slopes, without a trailed implement, reverse up for greater safety.
- Engage the clutch gently at all times, especially when going uphill or towing.
- Use as wide a wheel track as possible on hillsides and sloping ground.
- Descend slopes cautiously in low gear, using the motor as a brake.
- Never mount or dismount from a moving tractor.
- Ensure the park brake is on and operating effectively before dismounting.
- Take short breaks regularly when working long hours.

When towing implements

- Fit attachments according to the manufacturer's instructions.
- Always attach implements to the draw bar or the mounting points provided by the manufacturer.
- Never alter, modify or raise the height of the draw bar unless provided for by the manufacturer.
- Regularly check safety pins on towed lift-wing implements, to ensure they are not worn.
- Ensure all guards on towed implements are in place before operating.
- Never hitch above the centerline of the rear axle, around the axle housing or to the top link pin.
- Never adjust or work on implements while they are in motion.
- Never attach implements unless the PTO shaft is guarded.
- When parking, always lower the three-point linkage and towed implement.

To avoid strain injury

- Adjust the tractor seat for back support and comfort.
- When buying a tractor, ensure seating is safe and comfortable.
- Check seat height, seat depth, backrest height and angle, fore and aft movement, seat tilt, firm padding, partial pivoting (if you have to spend long periods looking behind you), and vibration-absorbing suspension.
- Dismount every hour or so, and spend 5 or 10 minutes doing something active.
- Plan for your next tractor to include suitably low steps, handgrips, adequate doorway and cab space, and a safe mounting platform.
- Dismount by climbing down - not jumping down - and use each provided foot and handhold.

Tractor Maintenance

People have been killed and seriously injured doing maintenance and repairs to farm tractors. Major hazards can occur when tractors are jacked and wheels are removed without safe working procedures. These risks are magnified on soil. Regular workshop maintenance of farm tractors and trailed implements can prevent hazardous incidents in the field.

Spot the hazard

When planning tractor maintenance, check the right equipment is available for safe jacking, removal of wheels and other tasks. People doing the job should be experienced, and there should be agreed safe procedures. Heavy lifting and carrying can cause strain injuries. Children should be kept away from tractor workshops. Field repairs present specific injury risks.

Assess the risk

The greater the risk of an injury or a dangerous incident occurring, the more urgent the need for changes to be made to minimize or eliminate the risk.

Make the changes

Here are some ways of improving tractor maintenance safety.

- Routinely adjust brakes, clutches and drives, according to the manual.
- Ensure steering, exhaust system and brakes are in top condition.
- Stop the motor before re-fuelling, servicing or greasing and, if possible, wait until the engine is cold before re-fuelling.
- Never remove or replace belts while pulleys are under power.
- Keep steps and working platforms free of grease and oil to avoid slips and falls.
- If the engine overheats, allow time for it to cool off before removing the radiator cap.

When jacking a tractor

- Jack on a flat surface, ideally a concrete floor.
- Avoid working alone. Ask somebody with training and experience to help.
- Refer to the manufacturer's manual on safe jacking, or seek professional advice.
- Where jacking points are not identifiable, jack from the lowest possible point.
- Use jacks that comply with applicable standards.
- Use vehicle stands that comply with applicable standards, and are designed for the load to be suspended.

Blocks and chocks

- Ensure wooden blocks for jacking are of hardwood, e.g. jarrah or karri, with a surface area that will support the tractor's weight on soft soils.
- Chock all wheels that will remain on the ground, using big wooden chocks at the front and rear of each wheel. Don't use rocks; they're too unstable.
- Chock all wheels on articulated vehicles to stop them twisting sideways during jacking.
- Before jacking, apply brakes, place in gear - or automatic park - and switch ignition off.
- Stay clear of the tractor while operating the jack.

When removing wheels

- Loosen wheel nuts before the wheel is off the ground, to avoid any movement that could dislodge the tractor.
- Before removing a tractor tire from a rim, release all water and air pressure.
- To avoid serious injuries, it is recommended that work performed on split rims be done by the professional. Therefore, farm workers should not work on split rims.
- Never jack more than one wheel off the ground at a time in the field.
- If both rear wheels have to be removed, work on a flat, level concrete floor, in the workshop.
- When removing rear wheels, ensure the front wheels are immobilized by fixing wedges between axle and body.

Using Grain Harvesting Equipment Safely

Combine Operator Safety

Good safety habits are vital for anyone who operates a combine, corn picker or other grain-harvesting machine. Failure to observe safety practices can be fatal!

However, constant alertness is also necessary to prevent machinery accidents--accidents that often happen in spite of machinery that is designed for safety.

Machinery operators are not in top physical or emotional condition when they are tired, ill, worried, angry, or have their minds on something else. Accidents are most likely to happen under these conditions.

The combine operator is responsible not only for his safety but also for the safety of others who may be working on or just be near the machine. The operator must be aware of hazards and remain alert to situations that are potentially dangerous. This includes pre-operational checks, starting, transporting, towing, operating, field repair and maintenance and stopping the combine.

KEY POINTS AND SUPPORTING INFORMATION

1. **Hand Signals.** A set of hand signals has been endorsed by several safety institutions. Since spoken instructions are very difficult to hear over the sounds of a combine, knowledge of hand signals can be extremely helpful to the operator when maneuvering a combine, especially in tight places.
2. **Safety Before Starting.**
 - a. Before attempting to operate a combine, study the operator's manual. It has information on general safety rules, plus specific safety recommendations for the particular machine. The more you know about the combine, the better prepared you will be to safely operator it.
 - b. The exhaust fumes from a gasoline or diesel engine are very poisonous. If the combine is run inside a building, be sure to open the doors to provide good ventilation.
 - c. Always clean the combine before starting. Trash around the exhaust system can cause fires. Oil, grease or mud on ladders or the platform can cause serious falls. If the combine is equipped with a cab, clean the glass to provide maximum visibility.
 - d. Check the tire pressure each day. Under-inflation can cause buckling of the sidewall, which can cause dangerous tire failure. Over-inflated tire

have a great deal of "bounce" and cause upsets more readily than tires with correct pressure.

- e. Check the brakes once a week. With hydraulic brakes, make sure that the master cylinder is full of fluid and that no air is present in the lines. Adjust the pedal free travel, if necessary, so that the brakes are engaged with the pedals an equal distance from the floor of the platform. Check the operator's manual for specific instructions.
- f. Check the threshing cylinder-rocking bar to see it is clear of the cylinder.
- g. Make sure that all shields and covers are in place and fastened securely.
- h. Remove or stow all service equipment.
- i. Always use the handrails and ladders provided on the combine for safe mounting and dismounting.
- j. Be sure that all PTO covers, safety stands and shields are on the machine before taking it to the field.

3. Starting the Combine.

- a. Before mounting the combine, make sure that everyone is clear of the machine. Do not allow anyone to ride with you, unless combine is equipped with a passenger seat.
- b. Before starting the combine:
 - Disengage header drive.
 - Disengage separator drive
 - Place gearshift in neutral
 - Depress clutch pedal
- c. Be careful when using diesel starting fluid. It is extremely flammable.
- d. If it is necessary to use jumper cables to start the combine, be careful to avoid sparks around the battery. Hydrogen gas escaping from the battery can explode. Follow the operator's manual instructions for using jumper cables.

4. Transporting the Combine.

- a. Always keep your mind on the dangers of driving the combine on public roads. Beside maintaining control of the machine, you must watch for obstacles on the road, pedestrians and traffic.
- b. High speed is the leading cause of accidents. Never drive faster than the road conditions allow for safe operation. Anticipate dangers and slow down to avoid accidents.
- c. Make sure you are familiar with local traffic laws. Check the safety flashers and small moving vehicle (SMV) emblems to be sure they are clean and visible.
- d. Always lock the brake pedals together. If the combine is not equipped with locking mechanism, be sure to depress both pedals at the same time evenly. Applying only one brake, or applying one harder than the other can cause the combine to swerve and perhaps tip over.
- e. Be careful when applying brakes when a header is attached to the combine. The added weight up front can cause the combine to tip forward if the brakes are applied abruptly. Always drive slow enough to allow controlled application of brakes at all times.

- f. Always check headlights and safety flashers to make sure they are properly adjusted and in working order.
- g. Put the unloading auger in the transport position. Be certain it is not blocking a safety flasher or SMV emblem.
- h. On self-propelled combines, never use the header safety support when transporting the machine. Raise the header enough for safe ground clearance, but not high enough to reduce visibility.
- i. On pull-type combines, always use header support when transporting. Towing at transport speeds can be hazardous because of side forces on the tractor when stopping too quickly. Side forces from slowing a combine too quickly may cause a tractor to skid, especially on loose gravel. Slowing down while turning can cause jack-knifing. Slow down before the corner so the towed combine doesn't get out of control.
- j. Watch for low power or telephone lines, bridges, buildings and any other obstacles, to make sure you can pass under them safely. Always keep as far to the right of the roadway as possible. Keep a careful watch to see that you have safe clearance on both sides.
- k. Always sit down when traveling at high speeds or going over rough terrain.
- l. Be careful when making turns. Make sure that the rear of the combine will clear obstacles when it swings around. Avoid sharp turns. Turning too sharply at high speed can cause the machine to turn over.
- m. Because the wheels for steering are in the back, self-propelled machines often fishtail when turned too quickly at transport speeds. Steering to the right will whip the rear to the left, and vice versa. Steering suddenly to the right when meeting oncoming traffic causes the back of the combine to swing out into the path of on coming traffic.
- n. Slowing or braking too rapidly could cause loss of some steering control (weight on rear wheels). This is most noticeable when driving with a corn head or some other heavy header raised high. In this case, most of the weight will be on the drive wheels. Install rear wheel weights. Keep header as low as possible. Use the variable speed drive or engine throttle to slow the machine. Reduce speed before you need to apply brakes and always lock brake pedals together.
- o. Never depress the clutch pedal or take the combine out of gear to coast down hill. When the combine is moving it is impossible to shift the transmission back in gear. Always maintain complete control of the combine. The same applies to tractors that are towing pull-type combines.

5. Towing the combine.

- a. If the combine must be transported over long distances, it is safer to haul it on a large truck or a special low trailer.
- b. Never tow the combine at speeds higher than 20 mph.
- c. Always keep the transmission in neutral or in the "tow" position, if the combine is so equipped.
- d. Never tow a combine equipped with hydrostatic drive. Towing can cause damage to the drive unit. Instead, haul the combine.

6. **Operating the combine.**

- a. Never operate the combine if you are ill or sleepy. Operating safety depends on alert, efficient handling of the combine.
- b. Wear safety glasses at all times.
- c. Wear clothing that fits snugly to avoid catching clothing in moving parts.
- d. Never let anyone ride on the combine unless it is equipped with a passenger seat. A rider's clothing may become entangled in moving parts, or he may be thrown off the machine.
- e. Before starting to harvest a field, check it carefully for ditches, fences or other obstacles. Be aware of weather conditions, which present safety hazards.
- f. Be especially careful when operating on hillsides. Avoid sharp turns that could tip the combine over. Beware of ditches or obstacles--they are doubly dangerous on slopes.
- g. If grain tank extensions are used, remember that the added weight may make the combine top heavy and more subject to upsets.
- h. Never travel over 10 mph (16 km/h) with a full grain tank. The added weight makes the combine more difficult to maneuver and easier to upset.
- i. Always sit down when traveling over rough terrain. A sharp jolt can throw you from the platform or away from the controls.
- j. Hillside combines are equipped with automatic or manual leveling devices. Hydraulic cylinders act to level these combines on steep slopes. These machines are equipped with a warning signal that indicates when the leveling system has reached its limit. Be especially careful after the device activates.
- k. When using the steering brakes, always turn the steering wheel before applying the steering brakes. Failure to do so can cause the combine to swerve and turn dangerously.

7. **Field repair and maintenance safety.**

- a. Always keep the machine clean. Field trash around the exhaust system can cause fires. Mud, grease or oil on the operator's platform or ladders can cause falls.
- b. Before lubricating or adjusting the combine, disengage all drives and stop the engine. Never leave the operator's platform with the engine running.
- c. Make sure that the header drive and separator drive are disengaged before attempting to clean the combine. Never try to unclog the machine with a stick or pole with the machine is running. The stalk rolls on a corn head can pull a 12 foot (3.6 m) stick through in one second--shorter sticks or stalks even faster--before you can let go.
- d. On a pull-type combines, always disengage the PTO and turn off the tractor before attempting to unclog, adjust or lubricate the machine.
- e. Always stop the machine before opening the inspection doors.
- f. Keep all shields in place. After working on the combine, make sure the shields are fastened securely.

- g. When operating in very dusty or noisy locations, wear goggles and ear plugs to insure safe visibility and prevent hearing loss. Never wear loose clothing that can become entangled in moving parts.
- h. Stay clear of moving parts at all times.
- i. Keep belts and chains properly adjust and aligned.
- j. Don't rely on the hydraulic system for support when working under the machine header. Always use the stops or supports provided on the machine. If no safety device is provided, block the header securely.
- k. When adjusting the wheel spacing, make certain the machine is blocked. Never rely on jacks alone for support.
- l. Always support the reel arm securely when adjustments are being made.
- m. Be careful when removing heavy parts. Make certain they are held firmly to avoid dropping them. Have someone help you with heavy jobs.
- n. When operating in dry fields. Install a spark arresting muffler to prevent fire.
- o. Avoid sparks or open flames when working the battery. Hydrogen gas escaping from the battery may explode.
- p. When possible always refuel the combine outside the field. Let the engine cool before attempting to refuel and never smoke around fuels.
- q. Allow the system to cool and remove the radiator cap slowly, turning it until pressure escapes through the overflow pipe. Make sure all pressure is relieved before removing the cap.
- r. Stay clear of the exhaust system until it cools.
- s. High-pressure fluid leaks in the hydraulic or diesel fuel system are very dangerous. The leaks can be invisible and still have enough pressure to penetrate the skin. When checking for leaks, use a piece of cardboard. If an injury does occur, seek medical aid immediately.
- t. Always carry a first aid kit and fire extinguisher on the combine.

8. Stopping the combine safely.

To make sure drive units do not cause injury when the machine is started again, do the following when stopping the combine.

- a. Disengage header drive
- b. Disengage separator drive
- c. Place gearshift lever in neutral
- d. Lower header
- e. Apply parking brake
- f. Remove ignition key to prevent tampering or accidental starting.

REMEMBER: The hydraulic drive unit is not an effective parking brake.

Source: Fundamentals of Machine Operation - Combines, Deere & Co.

Baling Hay

Large hay bales, some weighing up to 800 kg, have killed or seriously injured many farm workers. Bales, both round and rectangular, can fall on tractor and forklift operators, topple off stacks and vehicles on workers or bystanders, and collapse when stacks fail.

Spot the hazard

Look for hazards relating to:

Handling:

- Children playing near hay balers, carriers and stackers.
- Training of operators handling tractors, front-end loaders or forklifts.
- Use of two-poster tractor ROPS for baling - they offer no operator protection from bales falling back off forks or bale-loading frames. Tractors with cabs, FOPS (fall on protective structure) or four-poster ROPS are safer.
- Makeshift or poorly fitting bale-loading attachments on tractors and forklifts.
- Carrying bales too high off the ground.
- Insufficient counterbalance on tractor or forklift vehicle.
- Hydraulic control valve should be specific to the front-end loader attachment.

Baler operation:

- Baler properly connected to the tractor.
- Adequate safety guards fitted.
- Nobody allowed to ride on the baler.
- Prevent others getting too close to the baler.
- Build-up of loose, combustible material in the baler.
- Fire extinguisher fitted to the machine.
- Disengage PTO and apply fly wheel brake prior to making baler adjustments.
- Stop engine and apply fly wheel brake before repairs or "stringing up" the baler.
- Extra care and attention when reversing or turning the machine,
- working at night,
- loading onto a truck, and unloading.

Stacking:

- Loading and stacking on uneven ground.
- Stacks under or near overhead powerlines
- Stacks of round bales inadequately chocked and border posted.
- Damaged bales at base of stack – e.g., from vehicles, cattle or rodents.
- Unstable heights and loose stacking.
- Bales stacked higher than safe operating height of farm tractor or forklift.

- Children playing on stacked bales, particularly during stacking or unstacking.
- Lack of training, experience and protection for people doing hay baling, stacking and loading.
- Handling more bales than safe for the loader.

Transporting:

- Sturdiness of trailers carrying heavy loads of bales.
- Restraining frames back and front of trailer.
- Hooks fitted so ropes can be used to secure load.
- Roads too close to or below powerlines.
- Rough terrain causing bales to become unstable.
- Safe speeds at all times.
- People riding on loaded hay trailers - highly dangerous.

Assess the risk

Check each hazard that has been spotted to assess:

- Likelihood - how likely is this hazard to injure someone? and
- Severity - how severe would that injury be?

List all the hay baling and stacking hazards spotted, and number them in order of priority, so that those most likely to cause injury or harm can be tackled first.

Because most large hay bales can kill or seriously injure anyone they fall or roll on, any risk of a hazardous incident should be assessed as requiring urgent attention. And as children are the most vulnerable, consider child injury risks top priority.

Make the changes

Handling:

- Keep children away from hay baling and stacking operations.
- Make sure operators and handlers are properly trained and physically capable of tasks.
- Consider fall-arrest protection for people working at heights.
- Use tractors with four-poster ROPS, FOPS or cabs for protection against falling bales.
- Replace risky attachments with manufacturer approved attachments.
- Ensure loader or forklift operators transport bales close to the ground.
- Avoid sharp turns and unsafe speeds.
- Make sure vehicle controls are fitted specifically for the attachment in use.

Stacking:

- Stacks should be on firm, level ground, away from fire hazards, sources of ignition, overhead powerlines, dwellings, boundary fences and footpaths.
- Make sure stack and load heights do not exceed the lifting capabilities of the farm handling equipment.
- Big bales should be stacked to a maximum of four bales high.
- High density bales can be stacked up to six layers high.
- Wherever possible, stack big rectangular, square or high density bales by overlapping, to form a stable stack.
- Do not use bale lifting equipment to raise people on or off stacks.

Transporting:

- Do not allow people to ride on stacked trailers.
- Be aware of overhead obstructions, like trees, bridges and powerlines.
- Avoid rough ground that could cause bales to dislodge.
- Ensure loads are adequately secured.
- Do not overload vehicles beyond legal limits.

Tillage Equipment

While the skilled operator of tillage equipment avoids errors with very little conscious thought, accident studies show that hurrying and human error are responsible for or are involved in the vast majority of equipment accidents. An operator must have an understanding of the function, operation and limitations of the equipment he/she is operating and the operator must resist the temptation to be hurried into an accident.

KEY POINTS AND SUPPORTING INFORMATION

A. Moldboard Plows

1. Provide adequate front-end weight for tractor stability in transport and operation, particularly with integral and semi-integral plows. Never pull from any point higher on the tractor than the recommended hitch point.
2. Use extreme caution and reduce speed when transporting the plow and the tractor over rough ground.
3. Avoid sharp turns at high speeds, especially on slopes.
4. On tight turns, avoid swinging rear of plow into fences or other obstacles.
5. Turning stops on semi-integral plows limit turning radius. Shorter turns may severely damage plow frame and tractor hitch.
6. Never carry passengers on the tractor or permit others to ride on the plow - particularly plows with automatic reset.
7. Always lower the plow when not in use or left unattended.
8. Lower the plow and securely pin the parking stand before detaching the plow from the tractor.
9. Always use proper lighting, reflectors, slow moving vehicle (SMV) emblem, and other safety devices for road travel as required by state and local laws. (See appendix for more information on SMV emblems).
10. When hitching drawn plows, always use a hitch pin with adequate strength for the tractor-plow combination.

B. Disk Plows

1. Integral plows are transported completely raised, and all weight is carried by the tractor 3-point hitch. Adequate tractor front-end weights are required to offset the plow weight.
2. When the transporting on a road or highway, always display SMV emblem and use lights and reflectors as required by state and local regulations.
3. Semi-integral plows are quite long and caution must be used when turning to prevent swinging the plow into fences or irrigation ditches.
4. Reduce speed when transporting over rough ground, and avoid quick, sharp turns at high speeds.
5. When transporting semi-integral or drawn plows, always install cylinder locks to prevent accidental lowering of the plow. Relieve the load on hydraulic cylinders before starting to transport.
6. Lower the plow to the ground or install hydraulic cylinder locks when the plow is not in use.

7. Watch for other people when raising, lowering, or indexing the plow.
8. Never permit anyone to ride on the plow, and allow only the driver on the tractor. Do not permit children to play on or near the plow either when parked or in operation.
9. Lower the parking stand and securely pin it in place before detaching integral or semi-integral plows from the tractor.

C. Disk Tillers or Oneways

1. Keep SMV emblem clean and prominently displayed. Do the same with reflectors and warning lights as required by state and local regulations.
2. Never allow anyone but the operator to ride on the tractor.
3. Never ride or permit others to ride on the tiller.
4. Lower the tiller to the ground when not in use.
5. Secure the machine in the raised position by installing safety locks or hold-up pins when servicing or cleaning it.
6. Disk blades are extremely sharp; be very careful when working or making adjustments in the disk area.
7. Never walk close beside the rear wheel when the tiller is in operation. A sudden imbalance of forces could cause this wheel suddenly to jump to the left.
8. Never grease, oil, or adjust the tiller while it is in operation.
9. Escaping hydraulic oil under pressure can cause serious personal injury and infection. Therefore, be sure all connections are tight and that oil lines are undamaged. Always relieve hydraulic pressure in lines before disconnecting hoses. See a doctor immediately if escaping hydraulic oil has penetrated the skin.

D. Chisel Plow

1. Reduce speed when transporting chisel plows over rough or uneven terrain.
2. Use lock-up straps or transport locks when transporting a chisel plow.
3. Be sure wings are locked in the folded position before traveling.
4. Use proper lights, reflectors, and a clean SMV emblem when transporting equipment on road or highway.
5. The transport width of most folding-section plows exceeds maximum width of normal vehicles. Therefore, use extreme caution when meeting other traffic, to avoid collisions and the possibility of transport wheels dropping into holes, drains, or ditches along the road edge.
6. Allow only the operator to ride on the tractor.
7. Never allow passengers to ride on the chisel plow.
8. Never allow anyone to stand or work near the chisel plow when it is in operation, particularly when raising or lowering outriggers.
9. Do not permit children to play on or near the chisel plow during operation or storage.
10. Provide adequate tractor front-end ballast for stability in transport and operation, especially with integral models.

11. Be particularly careful of escaping hydraulic fluid, which can penetrate the skin and cause serious infection or reaction if not given immediate medical treatment.
12. Do not unhitch from the tractor or store a chisel plow when outriggers are in the raised position.
13. Make sure raised outriggers will safely pass under power and telephone lines.

E. Disk Harrows and Offset Disks

1. Always lock safety lock during transport, if the disk is to be left raised for an extended period, or while working on the machine.
2. Never depend on tractor hydraulic pressure to carry harrow weight in transport--use safety lock, and relieve pressure in cylinders.
3. Lower integral harrows to ground each time tractor engine is shut off, and any time harrow is being serviced or repaired. If it must be raised for repairs, securely block the frame to prevent accidental lowering.
4. Always use lights, reflectors, and SMV emblem when transporting, day or night.
5. Lock the tractor drawbar in fixed position when transporting wheeled disks.
6. Never transport a disk harrow on its own wheels at more than normal tractor speed, and considerably less than that on rough or uneven ground.
7. Never clean, adjust, or lubricate the harrow while it is in motion.
8. Wear protective gloves when working with or near disk blades.
9. Hydraulic fluid escaping under pressure can penetrate the skin and cause serious infection or reactions. Never use hands to locate the source of a small leak which may be nearly invisible. Obtain immediate medical attention if injured by escaping hydraulic fluid.
10. Park or block the harrow so it cannot roll when unhitched.
11. Make sure wings are securely locked in transport position before moving the harrow.
12. Large disk harrows exceed normal vehicle width, so be particularly careful to avoid collisions when meeting other vehicles on the road. Avoid dropping wheels of tractor or harrow into holes, drains, or ditches along the road.
13. Provide adequate tractor ballast for front-end stability and to prevent excessive slippage.
14. Never allow anyone to ride on tractor drawbar or harrow in operation or transport.
15. Never allow anyone but the operator to ride on the tractor.
16. Lower the machine or install safety lock when storing a disk harrow.
17. Never permit children to play on or near a disk harrow while it is in operation, transport, or storage.
18. Stand clear of harrow wings during folding or unfolding.
19. Remove spring-loaded scrapers in proper order to avoid personal injury. Use care in relieving any spring under tension or compression.
20. Do not make sharp turns with blades down.

F. Field Cultivators

1. Never exceed recommended transport speed for the cultivator used. If speed is not stated, do not exceed maximum tractor speed.
2. Reduce speed for turning and travel over rough or uneven ground.
3. Use transport locks and relieve pressure in cylinders when transporting field cultivators. Do not depend on hydraulic pressure to carry the weight. Always lock wings in transport position and relieve pressure in cylinders.
4. Never walk or work under wings when they are in the folded position.
5. Follow state and local regulations regarding lights, reflectors, SMV emblem, and maximum width when transporting on roads or highways.
6. Transport width of most field cultivators exceeds normal vehicle width. Therefore, use extreme caution when meeting other vehicles and avoid the possibility of dropping tractor or- implement wheels into holes, drains, or ditches along the road edge.
7. Never permit anyone to ride on the tractor drawbar or cultivator in transport or operation, or to stand near the machine while it is operating-- particularly when raising or lowering wings.

G. Toothed Harrows

1. Provide sufficient front-end weight for safe, stable operation and transport.
2. Use widest practical wheel tread to improve tractor stability, especially when working on steep slopes.
3. Reduce implement to narrowest possible width for transport on roads or highways.
4. Lock wings or folded sections securely in place before transporting equipment.
5. Use lights, reflectors, and SMV emblem as required by law when transporting equipment--day or night.
6. Schedule moves for least hazardous periods; avoid transporting equipment on busy roads, during peak traffic periods, or after dark.
7. Never transport wheeled harrows, harrow carts, or field conditioners at more than tractor transport speeds; transport considerably slower on rough or uneven terrain.
8. Never make sharp turns at high speeds.
9. Never allow anyone to ride on the tractor but the operator.
10. Never allow anyone to ride on the tractor drawbar or implement in operation or transport.
11. Always stop implement and tractor engine to adjust, repair, or lubricate.
12. Lower implements to the ground before stopping tractor engine, before servicing or repairing equipment, or at any time the machines are left unattended.
13. Never make extremely short turns with drag-type eveners which could foul tractor tires.
14. Never park implements where they could be hidden by tall or growing crops, grass, or weeds.
15. Keep PTO shaft properly shielded. Never get off tractor without disengaging PTO and stopping engine.

H. Packers

1. Always use reflectors, lights, and SMV emblem as required when transporting equipment--day or night.
2. Provide adequate front-end weight for tractor stability in operation and transport of integral harrows. Use maximum allowable front ballast if operating integral harrows in lower gears.
3. Never exceed normal tractor speed when transporting drawn roller harrows, and drive considerably slower than that on rough or uneven ground.
4. Do not transport roller packers over hard-surfaced roads--use carriers.
5. Never permit anyone but the driver to ride on the tractor.
6. Never permit anyone to ride on the tractor drawbar or implement during operation or transport.
7. Install transport lock pin before storing, transporting, or parking drawn implement; do not depend on hydraulic pressure to support the weight. Lower machines to the ground whenever the tractor engine is shut off.
8. Pin tractor drawbar in center before transporting.
9. Never lubricate, adjust, or repair the implement while it is in motion or the tractor engine is running.
10. Always raise spring teeth before lowering roller harrow to the ground for parking or storage.
11. Park or block the implement to prevent rolling when it is disconnected from the tractor.
12. Never try to lift or support the roller harrow on the spring teeth for service or repairs.

I. Undercutters

1. Use the SMV emblem, lights, and reflectors as required by law for transporting equipment on roads or highways.
2. Install the transport safety lock and relieve hydraulic pressure in the cylinders when transporting.
3. Be certain wings are securely locked in the folded position before transporting.
4. Limit transport speed as recommended--15 miles an hour (24 Km/h) for some machines, even less on rough or uneven terrain.
5. Never ride or allow others to ride on the machine during operation or transport. Allow only the driver on the tractor.
6. Do not unhitch from the tractor or store the machine with wings in the folded transport position.
7. Sweeps are sharp--watch out for them when wings are folded for transport or when servicing, adjusting, or repairing the plow. Always position wrenches to pull away from sharp edges or corners.
8. Never stand with feet under blades while making adjustments or during maintenance. Be extremely careful while working within the implement frame.
9. Do not stand or walk on the plow frame, or under wings when they are folded for transport.

10. Stand with both feet on the same side of the tongue when hitching or unhitching.
11. Do not allow children to play on or near the plow.

J. Rod Weeders

1. Allow only the operator to ride on the tractor during operation and transport.
2. Never permit anyone to ride on the rod weeder.
3. Never exceed recommended transport speed or, if not stated, maximum tractor speed. Reduce speed on rough or uneven terrain or when turning.
4. Use lights, reflectors, and SMV emblem as required by state and local regulations when transporting equipment, day or night.
5. Avoid busy highways and peak traffic periods if possible. Move equipment only in daytime.
6. Never attempt to repair, adjust, or lubricate the rod weeder while it is in motion.
7. Shut off the engine and relieve the hydraulic pressure in hoses before disconnecting them.
8. Never exceed recommended transport speed, or tractor road speed if maximum is not stated. Reduce speed when turning or crossing rough areas and slopes.
9. Always lower parking stands on integral equipment before detaching from tractor.
10. Always lower equipment or install transport lock before servicing, lubricating or repairing equipment, and when the machine will be left unattended.

All-Terrain Vehicles and Ag Bikes

The term 'Ag bike' refers to all motorbikes with two, three and four wheels, used for farm work. Three and four wheelers are also known as 'all terrain vehicles' or ATVs. **Three-wheeled ATV's are illegal and their use and operation is strictly prohibited.**

Spot the hazard

Most Ag bike injuries result from lack of training and experience, speed, uneven or unfamiliar terrain, humps, logs, rocks, embankments, carrying a passenger or an unbalanced load, inadequate protective clothing and unsafe driving. Those aged between 10 and 24 have a significantly higher risk of injury on ATVs.

Assess the risk

Ag bike injuries are predominantly to legs, followed by injuries to spine, arms and head. Three and four wheeler spills often result in the rider being pinned beneath or rolled on by the vehicle. Assess all use of Ag bikes for likelihood and possible severity of injuries. Develop safe use procedures to match the risk.

Make the changes

The following suggestions will help minimize risks.

- Never ride an Ag bike without an approved helmet.
- Long sleeves and pants, sturdy boots and gloves all provide protection if you come off the vehicle.
- Eye protection prevents serious eye injuries from bugs, branches or stones.

Maintenance

- Check your bike before riding it.
- Pay attention to maintenance advice in the vehicle manual.
- Check brakes and tires regularly.
- Ensure all parts are genuine or are at least equivalent components designed for use on your particular brand of bike.

Attachments

- Take extra care when using attachments such as spray tanks and other equipment on your ATV, as they can change the vehicle's center of gravity and affect its stability.
- Ensure any attachments are designed for use on your ATV.

Terrain

- Be on the lookout for potential hazards when riding. Rocks, bumps, irrigation pipes and wildlife all have the potential to cause an accident, and should be approached with caution.
- Take extra care when operating a bike on unfamiliar or rough terrain.
- Where possible, use familiar farm tracks.
- Be particularly careful when turning, approaching a rise or navigating an obstacle. If you are not sure of your ability to clear an obstacle, find another route or go back.

Paved surfaces and public roads

- Don't drive ATVs on paved or bitumen surfaces. They are not intended for use on smooth surfaces and could be difficult to control.
- Never ride ATVs on public roads. It may be difficult to avoid a collision if other vehicles are on the road.

Passengers and children

- Passengers and ATVs don't mix. ATVs are designed to be controlled by the shifting of weight around the vehicle. A passenger limits the driver's ability to do this.
- Never allow children to operate an ATV without training and appropriate supervision.
- Children do not always have the weight, limb size, skill and judgement to control an ATV safely.

Stunts and speeding

- Never attempt jumps, wheelies or other stunts on an ATV.
- Ride at an appropriate speed for the terrain, your experience and the visibility conditions.

Drugs, alcohol and fatigue

- Never ride under the influence of alcohol or drugs, including prescription drugs. They may affect your balance, vision, judgment and concentration.
- Fatigue can also limit your ability to control an ATV safely. Operating an ATV is more physically demanding than driving a car. If you are traveling long distances, take frequent rest breaks.
- Ensure you are dressed comfortably and appropriately - uncomfortable clothing can make you tire more easily.

Dangers of Agricultural Machinery

Farm machinery uses power to do work. This creates many possible hazards for both operators and bystanders. Even though manufacturers take many steps to make machinery safe, all hazards cannot be removed. Minor and serious injuries can occur when workers are not paying close attention, taking shortcuts, ignoring warnings or failing to follow safety rules. The wide variety of warning, caution and instructional decals placed on machinery are there for your safety.

There are many different types of farm machinery, but they all have similar characteristics and hazards. Not all these hazards can be completely shielded, so farmers must use caution when operating them.

Shear Points

Shear points exist when the edges of two objects move toward or next to each other closely enough to cut relatively soft material.

Cutting points happen when a single object moves forcefully or rapidly enough to cut. They can be found on many types of crop cutting equipment, such as forage harvester heads and sickle bars, and grain augers.

Shear and cutting points are hazards because of their cutting force. They often move so rapidly that they may not be visible, so it is easy to forget that they are there.

Pinch Points

Pinch points exist when two objects move together, with at least one of them moving in a circle. They are common in power transmission devices, such as belt and chain drives, feed rolls and gear drives.

Fingers, hands and feet can be caught directly in pinch points or they may be drawn into the pinch points by loose clothing that becomes entangled. Contact may be made by brushing against unshielded parts or by falling against them.

Shields cover most of these areas to prevent accidents, but once caught, these machines move too fast for someone caught to get out of a pinch point.

Be aware of these hazards and wear clothing that cannot be caught. Never reach over or work near rotating parts.

Turn off machinery to work on it and replace any missing shields.

Wrap Points

Any exposed, rotating machine component is a potential wrap point. Protruding shaft ends can also become wrap points.

A cuff, sleeve, pant leg or just a thread can catch on a rotating part and result in serious injury. Entanglement with a wrap point can pull a person into the machine or wrap their clothing so tightly the person is crushed or suffocated. A person can even lose their balance and fall into other machine parts.

Even a perfectly round shaft can be a hazard if there is enough pressure to hold clothing against the shaft. Shafts that are not round increase the hazard significantly. Universal joints, keys and fastening devices also can snag clothing.

Be aware of potential wrap points and shield those that can be shielded. Place warnings on those that cannot be covered or paint them a bright color.

Crush Points

Crush points exist when two objects move toward each other, or when one object moves toward a stationary object. Hitching tractors to implements may create a potential crush point. Failure to block up equipment safely can result in a fatal crushing injury. Workers need to be careful so they do not get caught in crush point areas.

Crushing injuries most commonly occur to fingers at the hitching point. Wait until the tractor has stopped before stepping into the hitching position. The head or chest of an operator may be crushed between the equipment and a low beam or other part of a farm building. Usually, these accidents occur when the machine is operating in reverse.

Tree limbs are also potential hazards.

Free-Wheeling Parts

The heavier a revolving part, the longer it will continue to rotate after power is shut off.

Rotary mower blades, baler flywheels and various other farm machinery components will continue to move after power stops.

Workers must allow time for these wheels or blades to stop before approaching them. This may take as long as two and a half minutes.

Pull-In Points

Pull-in points usually occur when someone tries to remove plant material or other obstacles that have become stuck in feed rolls or other machinery parts. Always shut off the power before attempting to clear plugged equipment.

Springs

Springs are commonly used to help lift equipment, such as shock absorbers, and to keep belts tight. Springs may harbor potentially dangerous stored energy. Know what direction a spring will move and how it might affect another machine part when released, and stay out of its path.

Hydraulic Systems

Hydraulic systems store considerable energy. They lift implements, such as plows, change the position of implement components, such as a combine header or bulldozer blade, operate hydraulic motors and assist in steering and braking.

Careless servicing, adjustment or replacement of parts can result in serious injury. High-pressure blasts of hydraulic oil can injure eyes or other body parts by burning or penetrating the tissue.

Leaks are a serious hazard. Never inspect hydraulic hoses with your hands because a fine jet of hydraulic fluid can pierce the skin. Get medical attention quickly, or you could lose that part of the body that was injected. Use a piece of cardboard to test the hose for leaks.

Follow the instructor's manual when servicing hydraulic systems. Make certain the hydraulic pump is turned off. Lower the attached equipment to the ground and confirm that load pressure is off the system. Treat hydraulic fluid as flammable liquid. Avoid open flames and sparks if hydraulic fluid has been spilled.

Being aware of these machinery hazards is the first step to prevent accidents. Following manufacturer's guidelines and working cautiously will help to produce a safer working environment for everyone.