



Guarding Farmstead & Farm Field Equipment

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The Occupational Safety and Health Administration (OSHA) has issued a Machine Guarding Standard for Agriculture. The purpose of the standard is to protect employees from hazards associated with moving machinery parts of farm field equipment and farmstead equipment used in agricultural operations. The purpose of this publication is to provide a clear summary of what the standard requires. Remember, this standard applies only to farmers who hire farm labor; however, family members deserve equal protection from hazards associated with moving machinery parts, too!

Farm Machines Covered

All types of farm machinery are covered by the standard. Agricultural machinery has been divided into two categories.

Farm field equipment includes all of your farm tractors and field implements, including self-propelled implements such as combines, swathers, hay balers, bale loaders, forage harvesters, hay cubers, and vegetable harvesters or any combination used in your agricultural field operations. Self-loading forage wagons, gravity-unload grain trailers, all types of manure spreaders and portable grinder-mixers are considered field equipment.

Farmstead equipment includes agricultural equipment normally used for stationary operations. This applies but is not limited to machines such as auger and flight elevators and conveyors, mechanical bunk feeders, all silo unloaders, bin unloading systems, grain dryers, grinders, mixers, sorting tables, coolers and all other types of material handling equipment.

How to Comply

If you are a farm employer engaged in agricultural operations, beginning October 25, 1976, you must meet the safety requirements explained in the following paragraphs.

NOTE: The Michigan Department of Labor has proposed a new standard on guarding farm equipment which incorporates more than is described in this supplement. Check at your county Cooperative Extension office for new developments.

1. It is the responsibility of the farm employer to immediately insure that he has adequate PTO guards in place. This means that you cannot permit **any** employee to operate a tractor or PTO-driven implement (regardless of the date of manufacture) around the farmstead, the packing and processing sheds or in the fields unless the power drive between tractor and implement is guarded. If the guarding devices have been misplaced or damaged beyond repair, PTO guards or shields equal to what the manufacture originally provided with the tractor or implement must be installed before use by your employees.

2. Effective October 25, 1976, and at least annually thereafter, all employee operators must be **instructed in the safe operation and servicing** of the tractors, field implements and farmstead equipment that they operate. Training requirements for your operating employees will be discussed in another section.

3. By October 25, 1976, you must equip all electric powered farmstead equipment with **mechanical or electrical disconnect devices** designed to prevent equipment from being inadvertently or accidentally started while it is being serviced or repaired.

Appropriate disconnect devices include:

(a) a locking means (lock-out) on the main switch which can be operated only by the individual performing the maintenance or servicing, or

(b) in the case of material handling equipment located in bulk storage structures (for example, silo unloaders, bottom unloading augers in grain and feed bins and the like), by installing an electrical or mechanical means to disconnect the power on the equipment. This can be a manual switch or mechanical clutch — or any other mechanical or electrical device that will provide positive disconnection of power.

All circuit protection devices must be manual reset types including those which are an integral part of an electric motor. With electrically powered labor-saving equipment like center pivot irrigators and well pumps for livestock watering, automatic resets will be allowed where the employer establishes that due to the nature of the operation, manual resets are "unduly burdensome." However, as an employer, you must provide an electrical disconnect switch within 15 feet of the equipment to be used when maintenance or service is required. A sign must be prominently posted near each electric motor to inform your employee that the motor could automatically start while he is working on it unless the electrical disconnect switch is utilized.

Employee Training

The OSHA Machine Guarding Standard for Agriculture requires that

Based on OSHA Bulletin 2256. All references to cotton gins in the standard were deleted.

you instruct every employee in the safe operation and servicing of all equipment (farm and farmstead machines) with which the employee is or will be involved. This is to be done at the time of initial assignment and at least annually thereafter. There is no requirement that evidence of training be documented or certified in writing by the employer. However, it may be desirable for the employer to verify that the training has been given. The required training must cover five major points.

1. Using Machine Guards

For the tractor: Make sure that your employees understand that the master shield over the power take-off stub shaft must be in place whenever the PTO is in operation. If the master PTO shield has been removed from the tractor for installation of mounted implements, a PTO stub shaft guard, usually in the form of a tubular cover or cap, must be installed. On some older tractors, the tractor's master shield is the point of attachment of the older type tunnel shields.

For the PTO-operated machines: Tunnel shields partially enclose the PTO shaft on many older machines. They must be coupled and uncoupled each time the implement is either attached or uncoupled from the tractor. They must be in place whenever the PTO shaft is powered.

Integral-journal shields completely enclose the PTO shaft. They are either a metal or a plastic tube supported on both ends by bearings that permit the tubular shield to turn independently of the PTO shaft. Cone or cup-shaped projections extend over the U-joint at both ends of the tubular shield. Instruct employees to make sure the integral-journal shield turns freely on the PTO power shaft before power is applied. Both the master shield on the tractor and the implement shaft guards should be in place to cover the exposed U-joints for safe operation.

The **fully shielded power shaft**, an improved version of the integral-journal shield, can be used without the master shield on the tractor, but the implement shaft guard must be in place.

2. No Riders

Farm tractors and field machines are not designed to transport workers. Caution all employees that they are permitted to ride only for instructional purposes and when required as machine operators. Employers may use "NO RIDER" signs as a safety reminder to employees for use on their field and farmstead equipment.

3. Stopping Engine

Failure to stop the engine and to disconnect the PTO drive on trailed implements or the power drive on self-propelled field machines too often results in serious injury or fatal accidents. Vibration from the engine has been known to have thrown machines into operation.

Use the Operator's Instruction Manual to explain and demonstrate to employees how to:

- (a) stop the engine of a tractor or self-propelled implement before dismounting from the operator's seat.
- (b) disengage the PTO control or power drive lever on either mechanical, hydraulic drive or self-powered implements.

Caution employees that they must never service, adjust or unclog the implement until the engine is stopped and all motion has ceased. It is the employer's responsibility to explain how both service and maintenance work can be completed in a safe and proper manner.

Certain adjustments or service must be performed with the machine running. An example would be operating the built-in knife sharpener on a forage harvester. In such cases, employees must be instructed in all steps and procedures necessary to maintain the equipment. Fortunately, many adjustments which must be made while the machine is running can be made from the operator's seat. An example of this is the variable speed control on a grain combine cylinder. Be sure to caution employees to follow instructions on warning or danger signs when working around your farm field and farmstead machines.

4. Keep Machinery Clear

The operator's view is obstructed by the size of machines such as potato harvesters, pea viners, vegetable harvesters, sugar beet harvesters, hay cubers and grain or corn combines. A set of standard hand signals, recommended by the National Safety Council, the National Institute of Farm Safety, or the American Society of Agricultural Engineers, may be taught to employees working either with, on or around machines. (see Agricultural Hand Signals, Agricultural Engineering Information Series, #328).

5. Electrical Power Off

Many serious injury and fatal suffocation accidents have resulted from accidental start-up of silo top unloaders and bottom unloaders in bulk grain and feed storage bins while service or maintenance was being performed by a person inside. Instruct employees that remote electric shut-off or lock-out controls should be checked before entering a silo or bin or working on a feed processing plant or similar equipment. Warning signs should be placed on the control switch box to warn of accidental start-up of remote controlled feed processing or materials handling equipment.

When instructing employees in safe operating and servicing of equipment, the Operator's Instruction Manual supplied by the manufacturer is valuable.

Other Requirements

There are several other machine guarding requirements to comply with on or after October 25, 1976, beyond those discussed in the previous paragraphs.

It is the responsibility of the employer to provide farm field equipment and farmstead equipment that protect employees from coming in contact with moving machinery parts! **Be cautious when selecting new equipment and make sure it is equipped with adequate guards before you buy.**

Equipment Points to Check

The **nip-points**, also called "pinch" or "mesh" points, on all driven gears, belts, chains, sheaves, pulley sprockets, idlers and rollers shall be guarded.

All revolving shafts must be guarded. On many new implements you will find "free turning" cylindrical guards over smooth round power transmission shafts. On other machines, the power driven shafts are guarded by rigid shields or positioned inside the machine where your employees can't contact the shaft when the machine is operating. Smooth shaft ends can extend up to half the outside diameter of the shaft beyond a guarded position. Guards are not required for smooth shafts and short protruding shaft ends turning less than 10 rpm on feed handling equipment used on the top surfaces of materials in bulk storages.

Snapping and husking rolls, straw spreaders and choppers, flair rotors, rotary beaters, mixing augers, feed rolls, auger conveyors, rotary tillers, broadcast star distributor wheels and other functional components of **field machines**, shall be guarded to the fullest extent which will not substantially interfere with crop and soil conditions.

On **farmstead equipment**, functional components such as choppers, rotary beaters, feed rolls, mixing augers or paddles, auger conveyors, grain spreaders, stirring augers, bin sweep augers, and feed augers shall be guarded to the fullest extent which will not substantially interfere with their normal operation. With silo top surface unloaders and similar equipment, a guarding device must be placed no more than 12 inches above the silage surface and no less than 6 inches in front of and parallel to the rotating gathering mechanism. Exposed auger flighting on portable grain auger elevators shall be guarded with either grated or solid baffle style covers. Grated guards shall have the largest opening no more than 4¼ inches long; each individual rectangular opening shall be no larger than 10 square inches and be no closer than 2½ inches to the rotating flighting. Slotted openings in solid baffle style

guards shall be no wider than 1½ inches or closer than 3½ inches to the exposed auger flightings.

All guards, shields, and access doors shall be in place when equipment is in operation.

The standard requires "visual or audible warning where one or more machine components continue to rotate after power is disengaged." A sign must be conspicuously placed on all equipment telling your employee to LOOK and LISTEN for evidence of rotation (sound, vibration, or visibly moving components) and NOT to remove the guard or shield or to open the access door until all rotation has stopped. Electrical disconnect devices required on certain farmstead equipment has been discussed earlier. Look for this important employee protective feature when you are buying, assembling, or modifying materials handling or irrigation equipment.

A Final Word

This standard won't eliminate all farming injuries. It should be obvious, however, that proper precautions can reduce accidents and injuries. If your machines are properly guarded as the standard requires and if workers are expected to know and follow safe operating procedures, your farm will be safer for you, your family members and for your employees.

The complete agricultural guarding standard is available in OSHA regional and area offices. Michigan's regional office is: Region V, U.S. Department of Labor, 230 S. Dearborn Street, Chicago, Illinois 60604 (toll free telephone number: 1-800-621-0523).

Summary

Effective Date: Oct. 25, 1976

Field and Farmstead Equipment

- **PTO:**
Tractors, farm field and farmstead equipment must be equipped with adequate PTO guards. Also, signs at prominent locations specifying that safety shields must be kept in place.
- **SIGNS:**
On all farm field or farmstead equip-

ment where removal of a guard or access door will expose an employee to a component which continues to rotate after power has been disengaged, a sign shall be placed in the immediate area warning the employee to look and listen for evidence of rotation, and not to remove the guard or access door until all components have stopped.

- **GUARDS:**

Guards, shields and their supports shall be capable of withstanding the force that a 250-pound person, leaning on or falling against the guard, would exert upon that guard.

- **WARNING:**

A visible or audible warning of continued rotation, after power is removed.

- **TRAINING:**

Safety training and education on equipment the employee operates shall be given at least annually.

Farmstead Equipment

- **RESETS:**

Motors shall be of the manual reset type except where: (1) it can be established that a manual reset is not feasible; (2) there is an electric disconnect switch within 15 feet; and (3) a sign is prominently displayed in the immediate area, warning of the hazard.

- **LOCKOUTS:**

All electrically powered equipment shall have a positive means of disconnecting power under the control of the operator performing maintenance.

FOR THE TRACTOR

Figure 1

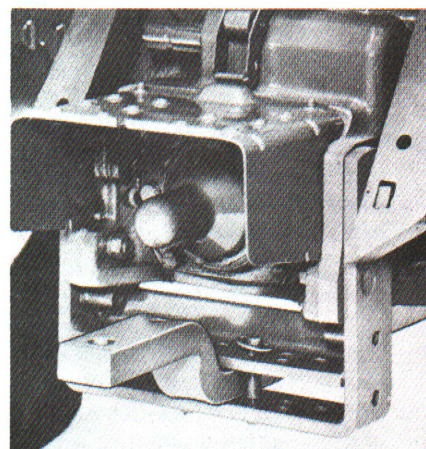
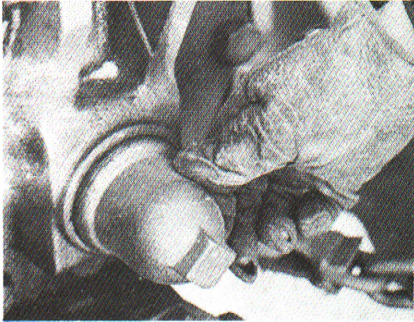


Photo courtesy of John Deere & Company

This master shield must be in place whenever the PTO is in operation.

Figure 2



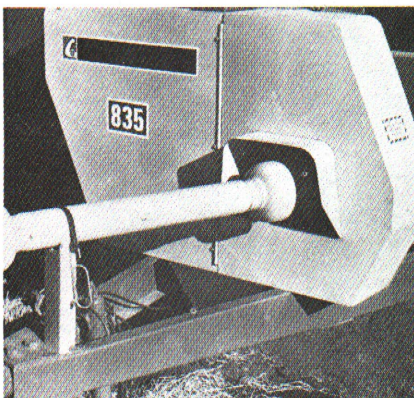
If the PTO master shield is removed, a PTO stub shaft guard must be installed when a master shield is removed or not available.

Figure 3



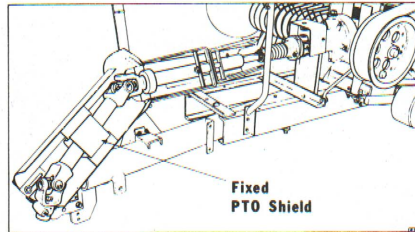
Tunnel shields partially enclose the PTO shaft on older machines.

Figure 4



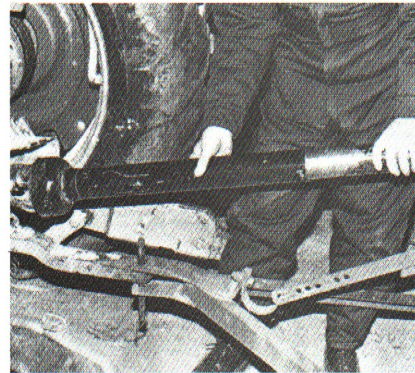
Tube (Integral-journal) shields completely enclose the PTO shaft and are permanently mounted.

Figure 5



Some PTO-operated machines have permanently attached shields to the implement PTO shaft.

Figure 6



Instruct employees to make sure the tube shield turns freely on the PTO power shaft before power is applied.

Figure 7

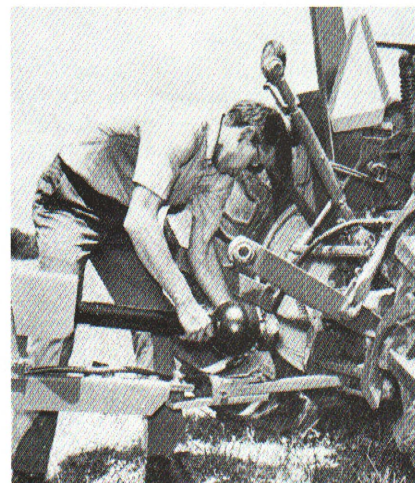
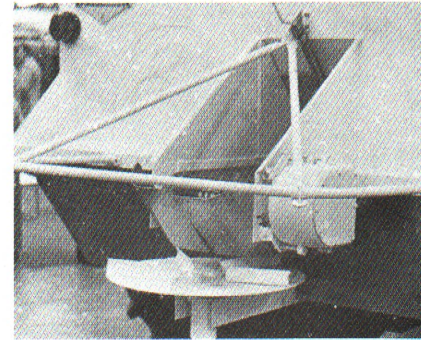


Photo courtesy of John Deere & Company
This fully shielded power shaft is an improved version of the tube shield.

FARM FIELD MACHINES

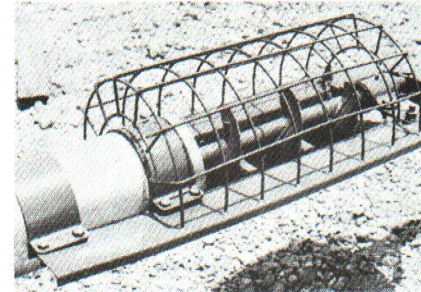
Figure 8



This shows a guard to keep employees away from the rotating star wheel on a fertilizer applicator.

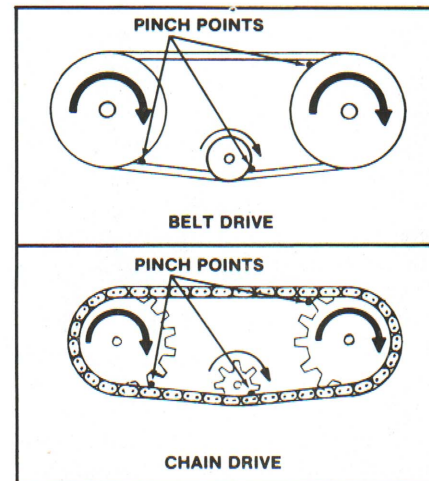
FARMSTEAD EQUIPMENT

Figure 9



Exposed augers and other functional components must be guarded to the fullest extent which will not substantially interfere with their normal operation.

Figure 10



GUARD THESE HAZARDS

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