



Safety and Health for Beginning Farmers¹

Mark A. Purschwitz and Cheryl A. Skjolaas²

As a beginning farmer, you need to know that agriculture is the most hazardous industry in the United States, according to worker death rate statistics from the National Safety Council. Agricultural workers, including farm owner/operators, family workers and hired workers, are five times more likely to suffer a fatal injury than the national work force as a whole. In addition to the 1,200 fatal injuries suffered in 1992, agricultural workers suffered an estimated 140,000 injuries serious enough to cause at least on-half day lost from normal activities.

You can prevent injuries on your farm by being proactive and consciously deciding to have a safe operation. Hazard control is the most effective way to do this; you need to search out and eliminate or reduce the hazards on your farm. Safe behaviors to avoid hazards are a secondary but necessary method of injury prevention when hazards cannot be eliminated.

This publication is intended to help you become aware of potential hazards and the most basic ways of eliminating or avoiding them. It is important that you understand the basics and start off your operation with a positive safety orientation. However, there may be hazards on your particular farm that are not mentioned here, and you should acquire more detailed information about all farm hazards on your farm. For more information, read your machinery owner's manuals and contact your local county Extension office or your state Extension agricultural safety and health specialist at your land-grant university.

TRACTORS

Tractors are the most-used machines on most farms, and are involved in more fatal injuries than any other agent of injury. The tractor rollover, when the tractor turns over on top of the operator, is the single most common fatal farm injury. Some of the causes of tractor rollovers include operating near hazards like ditches, gullies, holes, or stumps; operating on steep slopes; carrying heavy loads high; taking turns at high speeds; improper hitching; loss of control with towed loads; or roadway collisions. The most important way to prevent tractor rollover injuries is to have a ROPS Rollover Protective Structure or ROPS cab on every tractor, and wear the seat belt that comes with ROPS. Many tractor rollovers can be prevented by proper training and operation, and preparations such as proper wheel spacing.

The tractor runover, when the tractor runs over the victim, is the second most common fatal tractor-related injury. Many runover injuries involve extra riders who fall off; many of these are children. Other runovers often involve unseen bystanders, such as small children. Preventing runover injuries means never allowing extra riders, being aware of the locations of all bystanders, and keeping small children away from work areas.

Tractors and machines operated on the road should always have proper lighting and markings, such as amber flashers and SMV (Slow Moving Vehicle) emblems. All traffic laws should be obeyed, and extreme caution used with overwidth equipment.

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2. Mark A. Purschwitz, assistant professor and extension agricultural safety and health specialist; Cheryl Skjolaas, agricultural safety and health outreach specialist, College of Agricultural and Life Sciences, University of Wisconsin-Madison, Madison, Wisconsin, 53706.

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OTHER FARM MACHINERY

Farm machines other than tractors are involved in many fatal and permanent injuries. Whether it's mobile equipment used in the fields, or stationary equipment used around the farmstead, these machines have a variety of hazards that must be eliminated or avoided. Entanglement in moving parts is the major hazard, including PTO (power take-off drive lines and connectors; these entanglements can result in gruesome mangling, amputations, or death. All shields and guards must always be in place, including the master PTO shield on the tractor, and should be repaired or replaced if broken or missing. Machines should never be unplugged, adjusted, or repaired unless the machine is shut off and the power turned off, including the tractor if the machine is PTO-driven.

Like tractors, machines can be involved in runover injuries. Extra riders on tractors or machines can fall off and be run over by the machine; extra riders should be prohibited. Unseen bystanders such as small children are a hazard and must be kept from the work area.

Machine hydraulics also pose a hazard. Hydraulic lines can carry pressures as high as 2900 psi, and a pin-hole leak can easily penetrate the skin and cause severe tissue damage; looking for leaks should always be done with paper or cardboard. A failure in the hydraulic system, or an unexpected movement of a control, can allow a machine to unexpectedly drop; no one should ever work under any machine supported by hydraulics unless it is blocked up or a safety stop is in place.

Children in general should never be allowed around equipment. They may not appreciate the extreme hazards posed by operating machines and may reach in or not stay away. Children may play on parked machines and fall off it or have it fall on them. Parked equipment should always be lowered to the ground. Extra tractor wheels leaning up against a wall should be secured to prevent them tipping over and crushing someone.

ANIMALS

Large farm animals are responsible for many injuries on dairy and livestock farms. Bulls, especially dairy bulls, can suddenly turn on someone and cause fatal injuries, and should never be trusted. Stallions are also dangerous. Boars can seriously rip and tear with their tusks. New mothers, such as cow or sows, will vigorously defend their young. Any animal being handled can easily pin a handler against a wall or fence, or step on hands or feet. Facilities should be designed for safe animal handling to minimize the opportunity for such injuries.

STORAGE STRUCTURES

Storage structures such as grain bins (and grain wagons), silos, and manure pits have serious hazards which can lead to death.

Flowing or crusted grain in grain bins can lead to entrapment and suffocation. No one should enter a grain bin during unloading, as the downward flow of grain will pull a person under and entrap them. This is also true in grain wagons; the downward flow during unloading can easily entrap and suffocate a child. Crusted grain should always be broken up from outside the bin; surface crusting may hide a pocket that will unexpectedly collapse and bury a person, and crusted grain hanging up on a wall may unexpectedly collapse into an avalanche.

The main hazard of silos is silo gas, made up primarily of nitrogen dioxide, which will severely burn the lungs and may result in fatal fluid buildup. Silo gas is heavier than air and thus can also displace oxygen, leading to asphyxiation. Silos should not be entered for two to three weeks after filling, the peak period for production of silo gas. Silos should always be ventilated before entering, as should silo rooms or any place else where silo gas can collect. Silo unloaders also pose serious entanglement hazards; silos should never be entered while an unloader is in operation.

Some silos are designed to be airtight, and thus are oxygen deficient. These sealed silos should never be entered without an air supply unless they are totally ventilated, as the lack of oxygen will result in death.

Manure pits hold gases given off by decaying manure; the primary components are hydrogen sulfide, carbon dioxide, ammonia, and methane gas. Hydrogen sulfide is highly toxic; carbon dioxide is an asphyxiant; ammonia is an irritant; and methane is explosive. Hydrogen sulfide and carbon dioxide are heavier than air and stay down in the pit. A manure pit should never be entered without a supplied-air respirator, such as a self-contained breathing apparatus, not even by a rescuer, as the atmosphere will result in death. Agitation of manure greatly increases the gas release and is dangerous to humans and animals. Manure pits should be properly guarded against accidental or unauthorized entry.

SLIPS AND FALLS

Many farmers have suffered serious or fatal injuries by falling from ladders, roofs, hay mows, or other high places on the farm. Ladders on silos and grain bins should be child-proofed to prevent unauthorized use. Roof maintenance or construction should only be undertaken with proper equipment and safety in mind. Ladders for temporary use should never be propped on front-end loaders

or other unstable platforms. Haymow openings should be guarded against falls.

As simple as it seems, steps, stairways, and walkways around the farm, including steps and platforms on machinery, must be kept clear and clean to prevent slips and falls.

OVERHEAD POWER LINES AND ELECTRICITY

Overhead power lines are a hazard when operating or moving tall machines. Contacting these lines, which may operate at 7200 volts, typically results in electrocution. Moving portable augers around overhead power lines is especially hazardous; augers should always be lowered prior to moving. The best action to take is to bury, raise, or move power lines away from work areas.

Electricity in general is a hazard if not used with respect. Wet and corrosive environments around the farm yard mean it is imperative that proper wiring, controls, junction boxes and panels, and extension cords be used for those conditions. Ground fault interrupters should always be used when working in or around water, such as with a high pressure washer. Wiring should be properly maintained and repaired.

CHAIN SAWS AND WOODCUTTING

Chain saws are commonly used on farms, and can result in severe or fatal injuries. Kickback can cause the chain to contact the face, neck, or other parts of the body, with devastating cutting and tearing. Flying chips can damage the eyes. Longterm exposure to noise and vibration can cause hearing loss or "white-knuckle syndrome" of the hands. And of course felling trees and limbs can kill or paralyze. Proper personal protection, and proper felling and limbing procedures, are essential for safe woodcutting.

Tractor or bulldozer operators pushing down trees should always have a Failing Object Protective Structure (FOPS) on their machines, as trees and limbs can fall unexpectedly or in unexpected directions with serious or fatal consequences.

ALL-TERRAIN VEHICLES

All-Terrain Vehicles (ATV's) are being increasingly used in farm applications. This adaptability must not blind farmers to the need for proper personal protective equipment and proper training. With over 1300 people dying from ATV-related injuries from 1982 through 1989 alone, the safety of these machines should not be taken lightly. Helmets are especially important to prevent head injuries, and operation to prevent rollovers and subsequent spinal

injuries is crucial. ATV dealers should be contacted about training classes.

CHEMICALS

Many different chemicals may be used on a farm, depending on the type of operation, and it is important to obtain from the manufacturer or dealer the MSDS (Material Safety Data Sheet) for each hazardous chemical used. This sheet will outline the health hazards and appropriate precautions to take, along with other important information like handling and disposal procedures.

Acute (severe, one-time) and chronic (repeated, long-term) exposures should be prevented. Acute exposures to pesticides can result in severe or fatal poisonings. Accidental ingestion of dairy pipeline cleaner by children results in severe esophageal burns and scarring. A blast of anhydrous ammonia can result in blindness or other injury. Chronic exposures to some pesticides may result in increased risk of certain cancers; chronic exposure in general carries many uncertainties and should be avoided.

Exposure to chemicals can occur though inhalation, ingestion (including eating with contaminated hands), skin contact, and eye contact. The appropriate personal protective equipment, such as goggles, gloves, aprons, suits, etc., is extremely important when handling chemicals. Proper storage and disposal of chemicals protects unauthorized persons like children from exposure, protects animals and feed, and protects the groundwater.

RESPIRATORY HAZARDS

In addition to chemical-related respiratory hazards of silo and manure gases, and farm chemicals, other respiratory hazards exist on the farm. Exposure to molds in hay, silage, or grain can result in severe short-term illnesses like Organic Dust Toxic Syndrome (ODTS) or chronic allergic diseases like Farmers Lung. Exposure to grain dusts in general can result in bronchitis or other lung ailments and should be avoided. Dusts, dander, and other particles in livestock buildings can result in various respiratory and other illnesses. Proper ventilation and personal protective equipment is always needed to minimize such hazards.

NOISE

Repeated exposure to loud noise on farms has been shown to result in hearing loss. Noises louder than 85 decibels (db) should be protected against; tractors without sound-reducing cabs are often near 100 db. Older tractor cabs without proper sound and vibration protection can actually increase the noise level. Dryer fans and chain saws

are louder yet, and even the noise inside a hog confinement building can exceed safe levels.

Proper hearing protection must always be used against exposure to these noises, as hearing loss will gradually occur even if it is not noticeable at first. Even teenagers who work on farms have been shown to suffer premature hearing loss.

LIFTING AND REPETITIVE MOTION INJURIES

Many farmers are plagued by lower back pain. Numerous farm activities can lead to back pain, including lifting objects that are too heavy, lifting heavy objects incorrectly, lifting awkward-to-handle objects, moving or hitching equipment, or pushing or wrestling with cattle. Care must always be taken to lift properly, using the back and keeping the load close to the body. Where this is not possible, machines or other lifting aids should be employed. Since back pain can last a lifetime, thought should be given to how to make those jobs involving pushing or wrestling easier to manage.

Repetitive motion, such as constant kneeling when milking cows or repetitive hand motions when hand harvesting, can result in joint deterioration or injuries like carpal tunnel syndrome. Again, thought must be given to ways to avoid such motions, either through restructuring the job, using mechanical aids, or redesigning the workplace to eliminate the motions.

MAINTENANCE, REPAIR, AND CONSTRUCTION

Serious injuries can result from misuse of tools and unsafe maintenance or repair operations. Haphazard use of jacks and other lifting devices without proper blocking and stabilization can result in fatal collapses. Personal protective equipment for the eyes and/or other parts of the body are necessary when using power tools. Inflating tires can be hazardous, especially truck tires on split rims, which can explode with fatal force.

Construction operations should be undertaken with safety in mind. Trenches can collapse if not properly stabilized. Work on farm buildings or other structures should involve use of appropriate devices like scaffolding or safety belts to prevent falls.

CHILD SAFETY ON THE FARM

Children are particularly vulnerable to farm injury; since the home and workplace are combined, children are often present in the workplace. An estimated 175 to 300 children die each year from injuries related to farm work or

the farm workplace. Children are injured while playing in or wandering into a work area; while accompanying parents in the workplace; while helping their parents; or while operating equipment or performing other farm tasks.

It is imperative that parents give their children age appropriate tasks, suitable to the mental, physical, and emotional development of their children. Children should also receive thorough training in these tasks. It is equally important that children are not brought into hazardous areas, such as being extra riders on tractors, or be allowed to play in busy farm yards or other hazardous areas where they can get into trouble or not be seen by equipment operators. Dangerous areas like manure lagoons must be fenced off to prevent access by children.

REGULATIONS

Farms have relatively few worker safety and health regulations compared to general industry, but there are several regulations of which to be aware. Farm regulations may vary from state to state, especially with regard to the workers' compensation system, and farmers are cautioned to check with state labor authorities.

Federal OSHA has regulations for agriculture, and these regulations may be enforced on farms which have had 11 or more employees at any one time during the previous year. These regulations involve ROPS, equipment guarding, field sanitation, temporary labor camps, anhydrous ammonia, pulpwood logging, slow-moving vehicles, and hazard communication (providing information on chemical hazards to workers). These regulations carry the force of law and fines can result for lack of compliance. In some states these regulations apply to farms with a lesser number of workers; contact the state OSHA office for information.

The federal Hazardous Occupations Order for Youth prohibits youths under the age of 16 to be hired or even work without pay (with certain exceptions, such as on farms owned or operated by their parents or legal guardians) to do certain farm jobs. These include operating tractors and various farm machines; there are eleven prohibited job categories in all. However, youths age 14 and 15 may operate tractors and certain machines if they have completed a training course and receive certification. These certification courses are offered through some 4-H clubs, vocational agriculture instructors, or Extension agents. Contact them for more information on the program and restrictions.

The Environmental Protection Agency has recently developed the Worker Protection Standard (WPS) to provide additional safety for workers who handle or apply pesticides used in the production of agricultural plants. Requirements include various posting and notification requirements, worker training and protection, decontamination emergency assistance, and label compliance. The WPS applies to all farms regardless of size or number of employees; even farms without employees must comply with label requirements. Contact your Extension office or state department of agriculture for details.

Users of restricted-use pesticides are required to be certified to purchase and use these chemicals. Extension agents offer training and certification examinations.

SUMMARY

Agriculture is the most dangerous industry in the United States. You will be investing a great deal of time and money in your operation, and you do not want to throw that away by failing to take seriously the safety and health hazards on your farm. Searching out and eliminating or minimizing hazards on your farm is the most important thing you can do. Proper training of all who work on your farm, including family members, is also very important. This publication is only the beginning; you should read your machinery operators manuals and contact your county Extension office or state Extension agricultural safety and health specialist for more information.