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National Farm Medicine Center timeline

1959:	First federal grant awarded to Marshfield Clinic for a study of Farmer's Lung disease
1960s:	Continuation of work on Farmer's Lung disease plus other projects related to the agricultural industry, such as Organic Dust Toxic Syndrome and Maple Bark disease
1979-80:	Task force formed of Clinic specialists to discuss medical problems related to agriculture that they saw in their practices
1981:	National Farm Medicine Center formed as a program of the Marshfield Medical Research Foundation
1981:	Farm rescue training programs initiated
1982:	National Farm Medicine Center formally announced to community and media
1982:	First Auction of Champions fund-raising event held
1983:	Began annual health screenings at Wisconsin Farm Progress Days
1985:	"Today's Farm Health" radio series, with promotion statements by actor Eddie Albert, is broadcast by more than 200 radio networks nationwide
1987:	Farm injury surveillance project initiated
1988:	First environmental health project: underground fuel storage safety
1991:	Designated Center for Agricultural Research by the National Institute for Occupational Safety and Health; one of nine NIOSH-funded regional centers addressing research, interventions and education on region-specific agricultural health and safety issues
1992:	Named one of ten Prostate, Lung, Colorectal and Ovarian Cancer Screening Centers in United States
1992:	Conducted national Childhood Agricultural Injury Prevention Symposium
1992:	Named Children's Safety Network Resource Center, one of four in the United States
1993:	Environmental Health Laboratory established, with emphasis on pathogen virulence and infectious disease
1995:	Began strategic analysis of future of agriculture and implications for human health
1997:	Designated National Children's Center for Rural and Agricultural Health and Safety
1997:	Reproductive Toxicology Lab established, with emphasis on screening development toxicants and determining effects of agricultural exposures on reproductive health
1999:	Disseminated North American Guidelines for Children's Agricultural Tasks
2001:	Hosted National Summit on Childhood Agricultural Injury Prevention

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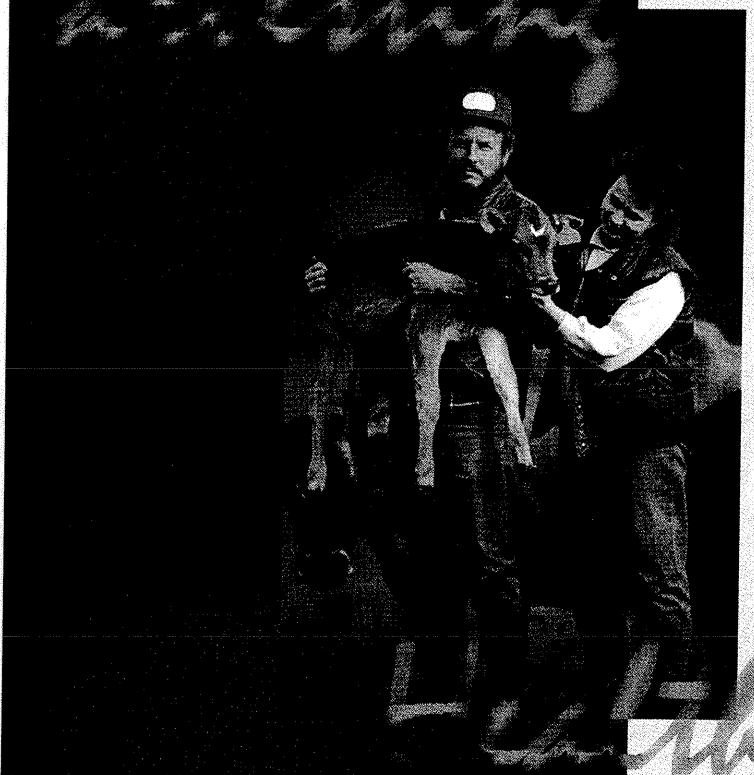

Back Pain

In a given year, between 30-60% of all Americans will suffer from low back pain. As many as 80-90% of Americans will experience an episode of back pain at some point during their lifetime. Here are some commonly asked questions about back pain.

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What causes back pain?

There are many possible causes of low back pain, including stretched (strained) muscles, torn or stretched (sprained) ligaments, ruptured discs, osteoarthritis, and tension or emotional stress. Sometimes the cause is unknown. Common risk factors for back pain include being overweight, poor physical conditioning, smoking, and improper lifting technique and body mechanics, including poor posture.

Are farmers more susceptible to back pain?

Farmers appear to be at an increased risk for low back pain in comparison to the general population. Farmers are involved in a wide variety of tasks that put strain on the lower back. Such tasks include operating heavy equipment (often for long periods without a break), lifting heavy objects, and daily exposure to the same repetitive motions.

What can I do to help prevent back pain?

Some general tips include:

- Maintain good posture – step forward with the entire body instead of reaching, and keep your feet shoulder width apart when standing.
- Use assistive devices whenever possible to simplify tasks (see below)
- Observe good lifting technique (see below)
- Change positions frequently, stretching before and during a task.
- Stay in shape with regular exercise and a healthy diet.
- Stay positive!

How does one lift properly?

Follow these recommendations:

- Plan ahead – think about the best way to lift an object before you start.
- Test whether you can lift the item alone or whether you will need assistance, taking both weight and bulkiness into consideration.
- Clear a path between you and your destination.
- Get close to object, use a wide balanced stance, get a firm grasp, and bend at the knees while contracting the abdominal muscles.
- Keep head and shoulders straight.
- Lift with the knees and leg muscles with slow smooth movements.
- Keep the object in close to your body.
- Pivot with your feet instead of twisting your back, and set the object down using the same techniques.

What can I do around home, the farm, or place of employment to reduce my risk of back injury?

- Automate as many tasks as possible. Automatic hitching systems, rope-controlled wagon disconnects, self-unloading gravity boxes, augers, and skid steer loaders are examples of devices that make certain tasks easier and reduce the amount of lifting and bending that is required.
- Appropriate use of carts, wheelbarrows, stools, tools, ladders, etc. can help prevent back injury. Using a cart or table to keep things at waist level minimizes the amount of bending necessary and makes lifting easier. Use a ladder or stool instead of reaching. A wheelbarrow, wagon, or hand truck can make it easier to handle heavy or bulky items.
- Work with tools (forks, shovels, brooms, etc.) close to the body.
- Rotate tasks in order to reduce repetitive movements and minimize fatigue and boredom.

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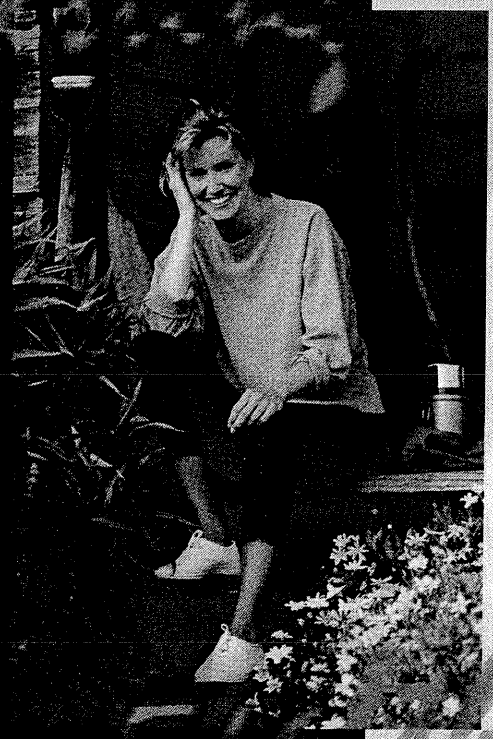

Breast Cancer

Breast cancer can be a major threat to a woman's health - but it doesn't have to be. It is almost always curable if found early. Here are answers to some commonly asked questions about breast cancer.

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What causes breast cancer?

The exact cause of breast cancer is not known at this time, but we know there are certain risk factors that are associated with the disease. These include:

- Increased age
- A history of biopsy that shows atypical hyperplasia
- A history of breast cancer among your mother, sisters, or daughters
- Recent oral contraceptive or post menopausal estrogen use
- Beginning menstruation before age 12
- Beginning menopause after age 55
- Having your first child after the age of 30 or never giving birth
- Higher education and higher socioeconomic status
- High dietary fat intake

The American Cancer Society (ACS) has identified other factors that are being studied but are not yet proven to be associated. They include alcohol consumption, pesticide and other chemical exposures, weight gain, lack of exercise and obesity.

What are the warning signs of breast cancer?

The signs listed here can be caused by breast cancer, but don't count on these signs for your early detection program. The most sensitive way to find breast cancers is through mammography. Through this technology, cancers can be detected when they are very small - long before you can feel them or see any signs. It is possible for signs to occur between mammograms, however, so you should know what to watch and feel for. Check with your physician if you experience:

- A lump, thickening, swelling or tenderness of the breast
- Changes in the skin surface such as dimpling or irritation
- Nipple pain or discharge

What can I do to prevent breast cancer?

Since the cause is unknown and so many of the known risk factors are beyond a person's control, this is a difficult question. The American Cancer Society advises that maintaining an ideal body weight and limiting alcohol consumption is a prudent approach.

At this time the best thing that women can do is **detect the problem early**. The keys to early diagnosis are breast self-exam, clinical breast exam and mammography.

What are the advantages of detecting breast cancers early?

Catching breast cancer early gives you a **great** advantage in your battle with the disease. In fact, according to the American Cancer Society, if breast cancer is detected in the initial stages, before it has spread to any surrounding tissues, a person's chance of surviving for five or more years is 97%. If it is detected when it has spread to tissues in the area, those chances go down to 76%; and if it has spread widely the five-year survival rate is only about 21%.

What tests should I ask for?

If you have a family history of a mother, sisters, or daughters with breast cancer; a personal history of a breast biopsy that shows atypical hyperplasia; or if you have any of the warning signs above, talk with your physician right away. You should be evaluated regardless of your age and you and your physician can decide which follow-up schedule is right for you.

If you don't have special risk factors or warning signs noted above and are age 20-39, the ACS recommends that you do monthly self breast-exams and have a mammogram and clinical breast exam every three years. If you are age 40 or over, you should do monthly breast self-exams and have an annual mammogram and clinical breast exam.

Where can I find more information about breast cancer?

There is new information about cancer and cancer treatment just about every day. For the latest developments, contact:

American Cancer Society, Inc.
1599 Clifton Road NE
Atlanta, GA 30329-4251
1-800-227-2345
www.cancer.org

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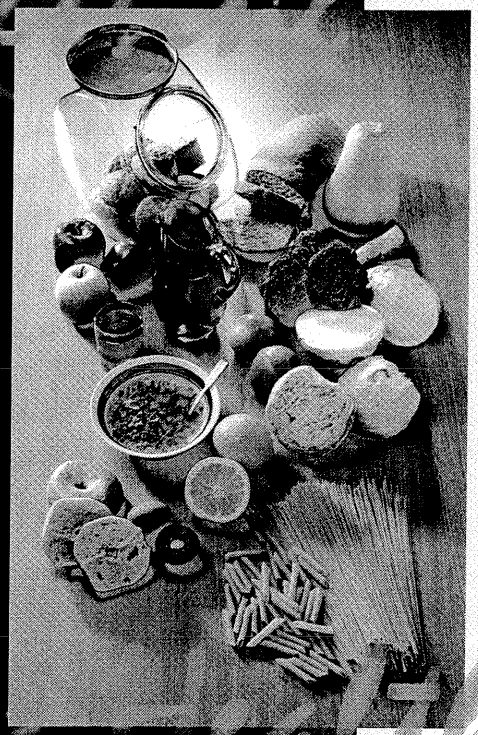

Colon & Rectal Cancer

Colorectal cancers are the second leading cause of cancer deaths in the United States, and they are a special risk for older Americans. The good news is that there are many steps that you can take to lower your risk.

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What causes colorectal cancer?

The exact causes of these cancers are not known at this time, but there are factors that are associated with colorectal cancers. These include:

- Age. The older you are the more likely you are to develop colon or rectal cancer.
- Your history. If you have a history of colon or rectal cancer, polyps or inflammatory bowel disease, your risk is increased. If people in your immediate family have had colorectal cancer or polyps, your risk is also higher. There are also some families that carry specific genes that increase their risk.
- Diet. A diet that is high in animal fats is believed to be a risk factor.
- Exercise. Inactive people are at increased risk.
- Obesity. Men who are obese are more likely to develop colorectal cancer.

What can I do to prevent colorectal cancer?

The American Cancer Society advises that healthy diets and regular exercise could prevent many of the cases of colorectal cancer that develop in the United States. There are definite steps that you can take to lower your risk:

- Minimize the amount of animal fats you eat. Choose lean cuts of meat and low fat dairy products.
- Eat more vegetables, fruits and whole grains.
- Make sure that you get regular exercise.
- Avoid becoming obese.

What are the warning signs of colorectal cancer?

The signs listed here can be caused by colorectal cancer. Check with your physician if you experience:

- A change in bowel habits
- A change in the appearance of your stool
- Blood in the stool
- Rectal pressure or a feeling of incomplete emptying after bowel movements

What are the advantages of detecting colorectal cancers early?

Catching colorectal cancers early gives you a **great** advantage in your battle with the disease. In fact, according to the American Cancer Society, if a colon or rectal cancer is detected in the initial stage, before it has spread to any surrounding tissues, a person's chance of surviving for five or more years is over 90%. If it is detected when it has spread to tissue in the area, those chances go down to 66%; and if it has spread widely the five-year survival rate is less than 10%. So as you can see, there is every reason to follow recommendations for screening.

What tests should I ask for?

If you have a strong family history, or a personal history of colorectal cancer, polyps or inflammatory bowel disease; or if you have any of the warning signs above, talk with your physician right away. You should be tested regardless of your age and you will be placed on a more frequent screening schedule than a person with "average" risk.

If you don't have special risk factors or warning signs and are age 50 or older, the ACS recommends three different options. You and your physician can decide which is right for you. They are:

- An annual fecal occult blood test, with a digital rectal exam and flexible sigmoidoscopy every five years
- A digital rectal exam and colonoscopy every 10 years
- A digital rectal exam and double-contrast barium enema every five to 10 years

Where can I find more information about colorectal cancer?

There is new information about cancer and cancer treatment just about every day. For the latest developments, contact:

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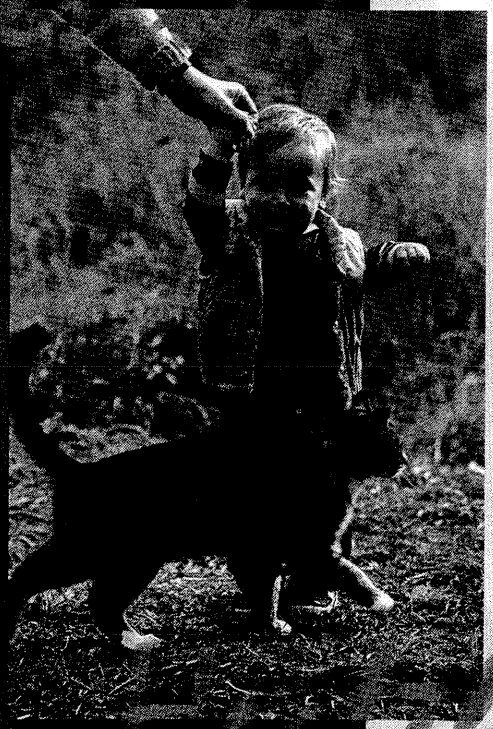

Children & Dairy Chemicals

Chemicals used to clean dairy facilities and equipment, especially dairy pipeline cleaners, pose a special risk for children. Here are answers to some questions that will help you protect children that visit your dairy.

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What dairy chemicals are dangerous for children?

A dairy operation uses a variety of chemicals, both acid and alkali-based for cleaning of the barns, parlors, and equipment. Most of these preparations are highly concentrated – powerful cleaning agents formulated for industrial settings. Although any of these agents can cause injuries, the most dangerous are the alkali cleaners that are used to disinfect and clean residual milk out of pipelines.

How does alkali cleaner cause injury?

The alkalis used in dairies are generally sodium hydroxide or potassium hydroxide-based and range in concentration from 8 – 25%. These products are many times more caustic than a common household alkali–based drain cleaner. These cleaners are so caustic that when they come into contact with skin or mucous membranes, they produce immediate chemical burns. Some children who have swallowed liquid pipeline cleaner have had burns severe enough to perforate their esophagus. Some have died from these ingestions; others have required repeated surgeries to repair scarred tissues. The long–term risk for developing esophageal cancer is greatly increased in these children.

How common are injuries from pipeline cleaning products?

There is no single source of statistics on alkali ingestion on farms. We can get some sense of the problem by looking at individual studies in selected areas. A South Dakota study found that fourteen children were seen in Sioux Falls area emergency rooms alone over a five-year period for caustic farm product ingestion. A study of four hospitals in Wisconsin over a ten-year period showed that ten children were admitted for dairy pipeline cleaner ingestion. These injuries are very severe, and since they are entirely preventable, even **one** injury is one too many.

How do children gain access to these chemicals?

Unlike caustic household products, which are packaged in accordance with the federal Poison Prevention Packaging Act, there are no childproof packaging requirements for these chemicals in agricultural or industrial settings. While children do not typically have access to industrial work areas, they can be present as family members or visitors in dairies.

For the cleaning products to be used, they must be transferred somehow to the equipment that needs to be cleaned. Some dairies use a closed system, where the cleaner is pumped directly into the pipeline. This is childproof and protects adult workers from spills and splashes as well.

However, in many dairies, the alkali is stored in large containers and is either poured or pumped into another small container, which is then carried to a point where it can be poured into the system. It is during this transfer process that young children, especially toddlers who want to touch and taste everything, gain access to the caustic. Tragically, some dairies use glasses, cups, squirt bottles, or other drinking containers for this transfer process, which makes the product even more attractive to the child.

What can be done to prevent these injuries?

Children should be separated from these chemicals at all times. One way to do this is simply to keep young children out of the milk house and/or chemical storage area. An additional safeguard is to use a closed system so the caustic is never in a container that can be accessed by children. Yet another prevention measure is to use packaging that is childproof. Some manufacturers have developed special transfer pumps and locking devices that are designed so that young children cannot open them.

Finally, many dairy operators simply are not aware of how dangerous these caustics are. Please share this information with others – but don't stop there. Awareness of the danger is not enough. Take one or more of the measures listed above and encourage others to do the same.

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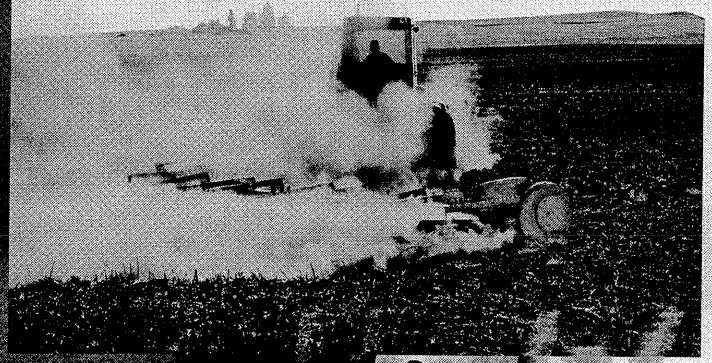

Dusts & Molds

Breathing. It's something that most of us don't even think about. But many farm and ranch workers don't breathe easily any more because their lungs have been damaged by dusts and molds.

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Why should I be concerned about dusts and molds?

Tiny dust particles and mold spores can be inhaled into the lungs. Dusts that come from a living source ("organic dusts") such as hair, bedding, hay, grain, silage, and dried urine and feces are most dangerous. In the natural process of decomposition, molds break down plant materials, producing spores and in some cases endotoxin. These tiny particles become airborne and are easily inhaled. Farm workers can be exposed to large amounts of dusts and molds in their everyday activities. Some of these substances can cause severe respiratory problems, both immediate and long term.

What is the difference between farmer's lung disease and ODTS?

Farmer's lung disease develops because of an allergic response, and only those susceptible will react (5-8% of those exposed). ODTS can happen to anyone exposed to high levels of organic dust. Many times people with ODTS mistake it for the flu. Farmer's lung disease, and to a lesser extent ODTS, can cause lung tissue damage.

What is farmer's lung disease?

It is a type of hypersensitivity pneumonitis caused by an allergic reaction to molds found in spoiled grain or forage products. Only some people are prone to develop this sensitivity.

What are the symptoms of farmer's lung disease?

Symptoms include chills, fever, cough, chest congestion, fatigue, and shortness of breath. These symptoms can appear from four to twelve hours after exposure, and can last from one to seven days. Since the sufferer has a sensitivity to the molds, each subsequent exposure becomes more severe and lasts longer. Over time, affected persons can also develop weight loss.

What is organic dust toxic syndrome?

Organic dust toxic syndrome is a condition caused by a reaction to inhaling a large "dose" of molds from spoiling grain and forage products.

What are the symptoms of ODTS?

Symptoms include cough, fever, chills, body aches, and fatigue. These symptoms appear from four to twelve hours after exposure to high levels of organic dusts and molds, and can last for one to seven days.

Allergic reactions to certain organic particles such as storage mites and cotton dust can range from a runny nose to asthmatic symptoms, depending upon storage conditions and the individual worker's sensitivity.

Chronic bronchitis is a problem for some agricultural workers, especially those who work without respirators in livestock confinement settings.

Inhalation of inorganic dust, such as the quartz dust common in California agriculture, can also lead to decreased breathing capacity over time (restrictive lung disease).

Lung infections such as psittacosis or coccidiomycosis can be caused by airborne bacteria or fungal agents. These diseases are not very common, but workers in certain agricultural settings are at increased risk.

How can I prevent exposure to dusts and molds?

Dusts and molds are almost impossible to avoid if you work in agriculture. But you **can** limit your exposure by taking these general measures. Think about how they apply in your setting.

- Prevent dusts and molds from forming, e.g. drying feeds and cleaning animal areas regularly.
- Prevent dusts and molds from becoming airborne e.g. adding oils to feeds, wetting down bedding before chopping or spreading, and wetting grain storage areas prior to clean out.
- Prevent inhalation, e.g. use a respirator as a barrier between the particles and your lungs.

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Eye Protection

Although they don't tend to make the headlines, eye injuries result in countless hours of lost work time for farmers and ranchers. Here are some practical tips for protecting your vision.

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How can I protect my eyes from chemical splashes and flying objects?

A variety of goggles, safety glasses with side shields, and face shields are available. Many are designed to fit over corrective eyeglasses.

Can sun exposure damage my eyes?

Research studies have shown that cumulative exposure to ultraviolet (UV) radiation can lead to the development of cataracts. Growths on parts of the eye and skin cancers of the eyelid may also develop as a result of UV exposure.

How can I protect my eyes from UV radiation?

Wear sunglasses and a hat with a wide brim (three inches or larger) when outside during bright sunlight.

Are there any special tips for selecting sunglasses?

The sunglasses should be UV absorbent, blocking 99 or 100% of all ultraviolet light. Look for the words "blockage" and "absorption" rather than just "protection" on the label.

- Lenses labeled "UV absorption up to 400nm" are the same as 100% UV absorption.
- "Special purpose" or "Meets ANSI UV requirements" lenses will block at least 99% of UV light.
- Polycarbonate (high-index plastic) tinted lenses will filter out 100% of harmful UV radiation.
- Plastic and glass photochromatic lenses (those that automatically darken in sunlight and lighten when indoors) offer 100% UV absorption. Plastic photochromatic lenses should be replaced after several years because they lose their ability to darken over time.

What are the dangers associated with welding?

Acetylene torch welding and cutting can expose you to visible, infrared (IR), and sometimes UV light radiation. Arc welding exposes you to all three forms of light radiation and can damage the cornea and cause a painful "flash burn."

How can I protect my eyes when I am welding?

Wear welding filter lenses that are designed to protect the eyes from visible, IR and UV rays. Choose the darkest shade that still allows you to complete the task. Welding filter lenses are rated from 2 to 14 (lightest to darkest). Start by selecting a shade that is too dark to see the weld zone, then switch to a lighter shade which gives sufficient view. There are also welding masks available with shields that automatically adjust to the light.

What are some good sources of eye protection equipment?

Most farm supply and hardware retailers carry sunglasses, safety glasses, goggles and welding masks with filtering lenses. Mail order and Internet–based safety suppliers are also an option.

What do eye protection products cost?

Goggles and sunglasses are available for under $10, and even these inexpensive models can offer the necessary features. Welding masks with filtering lenses are available for under $50. Masks/helmets which automatically adjust to light are available for under $200. When you consider the pain, lost work time and disability that eye injuries and conditions can cause, investment in this type of protection is wise indeed.

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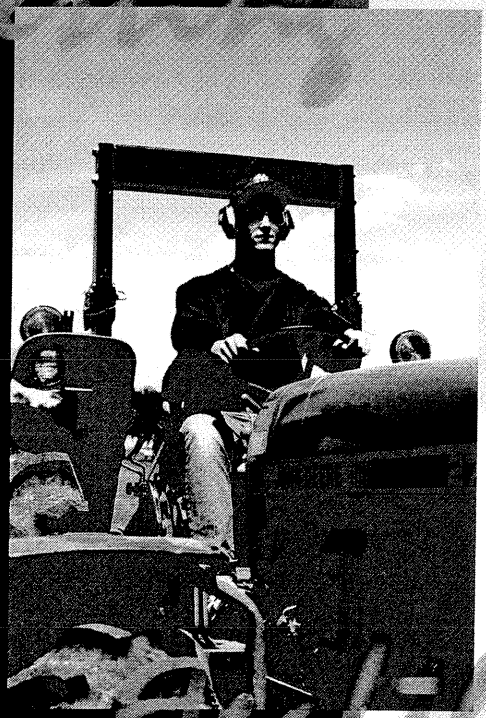

Hearing Loss

Hearing loss is common among people who work around loud noises – but it doesn't have to be. Here are some simple steps you can take to protect your hearing.

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What causes hearing loss?

Loud noise is the most common cause of permanent hearing loss. You don't "get used to" loud noise; you lose your ability to hear it. Both the decibel level and the length of exposure factor into the amount of damage that can be done. Research has shown that even teenage farmers can suffer from noise-induced hearing loss.

What sound levels are dangerous?

	Noise level (Decibel)	Common Sounds
Safe Zone	0	Lowest audible sound
	50	Quiet empty barn, babbling trout stream, gentle breeze
	60	Normal conversation
	70	Chicken coop, farrowing area
The Danger Zone	85	Tractor or combine idling, barn cleaner, conveyor, elevator: At this decibel level, noise may begin to affect your hearing if you are exposed to it for more than 8 hours per day.
	90	Blower compressor, pneumatic wrench, chopping silage (no cab), full throttle lawn mower: As noise gets louder, the "safe" time decreases; damage can occur if you're exposed to it for more than 4 hours per day.
	100	Tractor at 80% load, squealing sows, power tools, hand-held metal grinder: 1 hour of exposure per day is the limit at this decibel level.
	110	Average walkman set above the halfway mark, full-throttle combine, 10-HP vane-axial barn fan: Anything over 15 minutes exposure per day can cause damage.
Very Dangerous	120	Thunderclap (near), sandblasting, bad muffler, old chain saw: The danger is immediate.
	140	Gunshot, engine backfire, dynamite blast, jet engine: Any length of exposure time is dangerous, and may actually cause ear pain.

What are some other ways that I can judge sound levels?

A noise is too loud when:

- Your ears ring after you are exposed to noise
- Speech and other sounds seem muffled after you are exposed to noise
- While working, you have to shout to be heard by someone next to you

What can I do to protect myself?

There are two general steps you can take: Reduce the total noise that is being generated, and use earmuffs or earplugs as a barrier between your sensitive ears and the noise source.

Reducing vibration of machine parts through replacement and lubrication are ways to reduce total noise. High quality mufflers and acoustically designed cabs provide further protection. But, most agricultural work areas are somewhat noisy, so earplugs and muffs should be used as your final "line of defense" against hearing loss. Plugs and muffs are inexpensive and come in many styles, so you will be able to find a model that is right for your situation.

Where can I purchase earplugs and muffs?

Some farm supply and hardware stores carry earplugs and muffs. Mail order and web-based safety supply companies offer an economical and convenient alternative.

What are some other ways to protect myself?

- Take a break from the noisy work every hour or two.
- Have a yearly hearing test to check for hearing changes.
- Have tractor and combine cabs recaulked and replace all worn or missing weather stripping.

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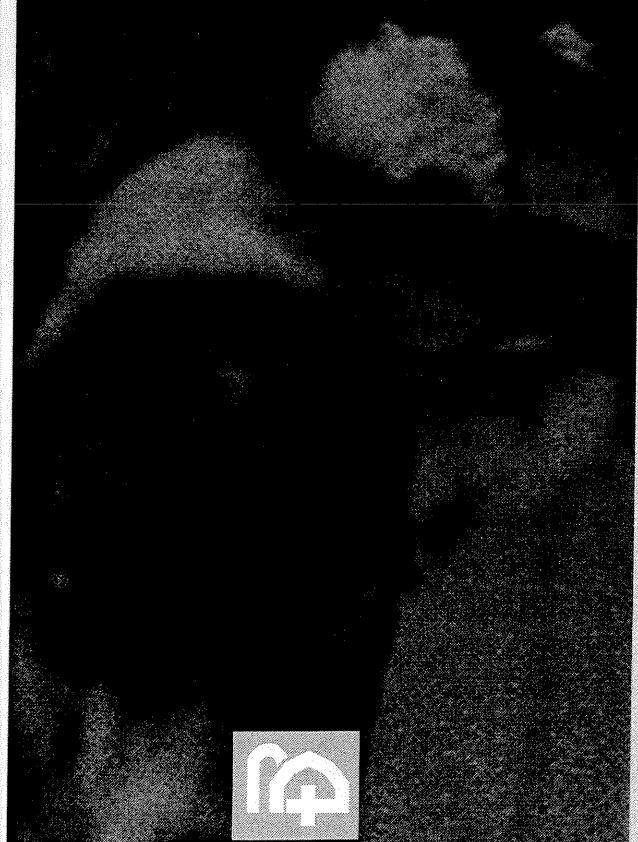
Manure Gases



Manure gases are some of the most common toxic gases in a farm environment. Here are the answers to some of the most commonly asked questions about these substances.

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What is manure gas?

Manure gas is actually a name used for several different gases formed by decomposition of manure. The main gases are methane, carbon dioxide, ammonia, hydrogen sulfide and hydrogen disulfide. In certain concentrations, all of these gases are toxic to animals and humans.

When and where are manure gases present?

Since most of these gases are heavier-than-air, they tend to settle in low areas of manure storage or accumulation. Methane, which is lighter than air, is found above and around manure storage areas. Gas levels are generally very high at the time of agitation and in cases where ventilating systems are failing or inadequate. But, even a relatively empty manure pit may have high concentrations of toxic gases or may be lacking in oxygen. Always assume that the gases are present in storage areas.

Why are manure gases dangerous?

In some situations, gases can displace enough of the oxygen in an environment so that a person entering the area is asphyxiated, leading to death. In other cases, the gases can lead to toxic effects that make a person very ill and can cause long term health problems. The real danger is that it is impossible to evaluate your risk just by looking at a situation. Manure gases are invisible – and deadly.

What if a manure pit needs to be entered?

Never enter a pit unless you have specialized training and equipment. If you don't have specific training in confined space entry, get the help of your local fire department or emergency trainers before anyone enters the storage area. These individuals will be trained in the proper use of self-contained breathing apparatus (airtight units with built-in oxygen supplies). They will know how to use a safety line and harness with retrieval equipment, and will work with two other people outside the pit who are prepared for a safe rescue.

This advice is also critical for you if you come upon a situation where someone has been overcome by manure gases. There have been too many tragic stories of multiple deaths because a family member, neighbor or coworker attempted to rescue someone who had lost consciousness in a confined space. If you are faced with this situation call your local rescue squad, tell them about the victim, and do not attempt a rescue yourself.

What are some other tips to avoid exposure to manure gases?

- Remove all people and if possible, all animals from buildings over pits before pit agitation.
- Provide maximum ventilation when agitating or pumping manure.
- Do not smoke or have fire or ignition sources around manure pits.
- Do not fill manure pits to capacity - leave one to two feet of air space.

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Harvesting Health

Respirators

People involved in agriculture work around substances that can cause breathing problems. Choosing and using the right respirator can be the key to protecting your lungs.

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What does a respirator do?

A respirator filters out substances or blocks gases or vapors that can cause harm to the lungs.

What are the types of respirators?

Disposable dust respirators filter particles and some mists and are made of a shaped piece of material held to the head by two straps.

Chemical cartridge respirators protect against gases and vapors. The replaceable cartridges contain a substance that adsorbs specific gases and vapors. Many also come with replaceable pre-filters.

Powered air-purifying respirators move filtered air over the face inside a face piece. A rechargeable battery pack attaches to the belt of the wearer. This kind of respirator is especially good for individuals with heart and lung conditions who might not be able to use other respirators, or for individuals with beards or sideburns who cannot get a good fit with other respirators.

SCBA or self contained breathing apparatus units supply safe air and shield you completely from toxic gases.

How do I know what kind of respirator to buy?

A coding system is used by manufacturers to help users choose the right type of respirator for their work. In July of 1998, respirators coded with N, R, and P codes became available. These certification categories apply to nonpowered, particulate filter respirators.

The designation "N" means the respirator is not resistant to oil; "R" means it is resistant to oil; and "P" means the unit is oil proof. All three classes of filters are available in efficiency levels of 99.7%, 99%, and 95%. For example, a respirator marked N95 would be at least 95% efficient and is not resistant to oil.

Can I reuse a respirator?

Yes, in most cases respirators can be reused. The length of use for each disposable respirator depends upon your breathing rate and the amount of exposure to a contaminant. A respirator should be changed when it appears soiled, or when you notice it becomes difficult to breathe through. Cartridge respirators also require replacement of pre filters and cartridges when they become difficult to breathe through.

Never wash or blow out respirators, filters, or cartridges because this destroys their filtering properties. Instead, replace them with a new unit.

What do I look for when shopping for a respirator?

Look for two things: NIOSH approval indicated by N, R, P coding, and a label that lists the substances from which the respirator will protect you.

What other things should I know about respirator use?

A snug fit is essential to your protection. Be sure to follow the manufacturer's directions for a proper fit every time you wear the respirator.

If you have a heart condition, asthma, emphysema, or other chronic lung condition, you should check with your physician before using a respirator.

How should I store my respirator?

When not in use, store your respirator in a handy place near your work area and in a dry container such as a closed plastic bag or a covered coffee can. This protects it from contaminants and extends its life. Don't store your respirator in direct sunlight, since it can cause the respirator and straps to deteriorate.

Where can I purchase respirators?

Some general farm supply stores, cooperatives and pharmacies carry respirators. Mail order is also an economical and convenient way to purchase a variety of types.

What does a respirator cost?

Depending upon the supplier and the quantity purchased, NIOSH-approved dust respirators can be purchased for as little as 75 cents each.

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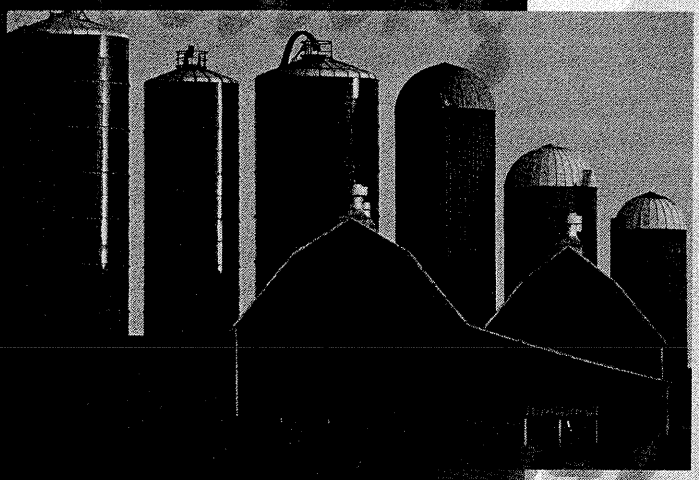

Silo Gas

What you know about silo gas could save a life. Here are answers to some of the most commonly asked questions about this dangerous substance.

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What is silo gas?

Silo gas is actually nitrogen dioxide, an extremely toxic, yellowish-brown gas with a bleach-like odor. During the fermentation process, oxygen combines with nitrates in plant materials resulting in the production of nitric oxide gas. This combines with oxygen in the environment to produce nitrogen dioxide.

When and where is silo gas present?

The gas can form from a few hours to three weeks after materials are put in the silo. It is heavier than air, so it settles at low points in the enclosure.

Why is silo gas dangerous?

When nitrogen dioxide is inhaled and comes in contact with the moisture in your lungs, it actually forms nitric acid. This acid causes chemical burns of the airway and lungs, and sometimes complete asphyxiation. Silo gas acts very fast – many people inhale it and never regain consciousness. Those who do survive often have permanent disability because of scarring of the lung tissue.

What are the symptoms of silo gas exposure?

Coughing, burning in the throat, shortness of breath, chills, fever, headaches, nausea, or vomiting can occur from 3 – 30 hours after even a mild exposure. Fluid build-up that occurs in the lungs after the exposure can be fatal. If you know someone that has been exposed to silo gas, have them see a doctor immediately. Early treatment can improve a person's chance of survival.

What can I do to prevent exposure to silo gas?

The only sure way to prevent exposure to silo gas is to stay out of the silo during the first three to four weeks after filling, or to use a self contained breathing apparatus (also called SCBA) and approved confined space entry procedures to protect yourself. If you don't have specific training in confined space entry, get the help of your local fire department or emergency trainers.

Many different techniques have been suggested to reduce levels of the gas in recently filled silos. Running a blower and opening doors is helpful in reducing gas levels and in **some** cases may remove all the gas, but this method is not foolproof during the first critical weeks when most fermentation is occurring. The fact remains that some farmers have taken these precautions and still been seriously injured.

If it is necessary to enter a silo **after** the initial dangerous period has passed, the farmer should open all doors and vents and run the blower for at least one hour as an extra precaution. During the filling and post filling period, it is also important to ventilate any structures that connect the silo with areas that house animals and workers.

Remember, silo gas is heavier than air, quick and deadly – by the time you see it or smell it, it is too late.

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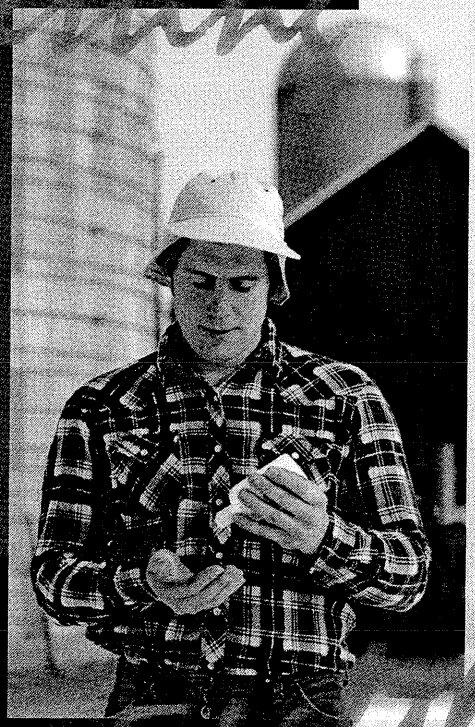
Harvesting Health™



Skin Cancer

People who work in the sun are more likely to develop skin cancer - unless they protect themselves. Here are answers to some commonly asked questions about sun protection.

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What causes skin cancer?

Sunlight damages your skin and this damage can lead to skin cancer. Both too much sun, resulting in sunburn, and the total amount of sun a person receives over the years can cause skin cancer.

Why do agricultural workers get skin cancer?

People who work in agriculture tend to work many hours in the sun, so they have a greater risk of getting skin cancer than the general population.

What are the risks of developing skin cancer?

About 1 out of 7 people in the United States will develop some form of skin cancer. One serious sunburn can increase your risk by as much as 50%.

What factors increase my risk?

If you spend a lot of time in the sun, if you have fair skin, or if you have a history of skin cancer in your family, you have a greater risk of developing skin cancer.

What can I do to prevent skin cancer?

Staying out of the sun is the best defense against skin cancer. If you cannot avoid the sun, take these three steps to help reduce your risk.

Step One

Limit the time you spend in the sun between the hours of 10AM and 4PM.

- Whenever possible try to arrange your work schedule so that the majority of your outside work is done before 10AM or after 4PM
- Use machinery with cabs or shades that protect the operator if field work must be done during the middle part of the day.

Step Two

Wear clothing that covers your body and shades your face.

- Tightly woven long-sleeved shirts and pants
- Hats with three inch or greater brims (baseball caps leave the tips of your ears and back of your neck exposed to the sun's rays)
- Sunglasses

Step Three

Apply sunscreen with a sun protection factor (SPF) of 15 or higher.

- Select a sunscreen with UVA and UVB protection
- Apply it 20 to 30 minutes before going outside
- Reapply every two hours; more often if you are perspiring heavily

Where can I find more information about skin cancer?

American Cancer Society, Inc.
1599 Clifton Road NE
Atlanta, GA 30329-4251
(800)227-2345
www.cancer.org

National Cancer Institute
Office of Cancer Communications
31 Center Drive, MSC 2580
Bethesda, MD 20892-2580
Cancer Information Service Hotline
1-800-4 CANCER 1-800-422-6237
http://cancernet.nci.nih.gov/general.htm

The Skin Cancer Foundation
PO Box 561
New York, NY 10156
(800) SKIN 490
info@skincancer.org
http://www.skincancer.org

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Farm Machinery and Lawn and Garden Equipment

2000

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Current Industrial Reports

Information about the scope of the survey, methodology, explanation of terms and historical notes for this survey may be found in the introduction of the 1998 Manufacturing Profiles, issued December 2000.

Current data are released electronically on Internet for all individual surveys as they become available. Use: http://www.census.gov/econ/www/manumenu.html. Individual reports can be accessed by choosing "Current Industrial Reports (CIR's)," clicking on "Report Number Index;" from the "Industrial Products by Numeric Index," choose the survey of interest. Follow the menu to view the PDF file or to download the worksheet file (WK format) to your personal computer.

These data are also available through the U.S. Department of Commerce and STAT-USA Electronic Bulletin Board by subscription. To access, dial 202-482-3870 and follow the prompts to register. Also, you may call 202-482-1986 or 1-800-STAT-USA, for further information. The Internet address is: www.stat-usa.gov/.

NOTE. Data are now published on the New North American Industry Classification System (NAICS) basis and therefore are not always comparable to the old Standard Industrial Classification (SIC) code. For further information on NAICS, see www.census.gov/epcd/www/naics.html.

SUMMARY OF FINDINGS

During 2000, factory shipments of farm machinery and equipment, including parts and attachments, produced by original equipment manufacturers (OEM), totaled $11,966.4 million, a 17-percent increase from 1999 shipments of $10,266.4 million. Shipments of farm dairy machines, sprayers, dusters, elevators, farm blowers, and parts totaled $884.6 million, an increase of 8 percent over the 1999 total of $816.8 million. The value of shipments for harvesting machinery and parts increased 11 percent, from $1,553.1 in 1999 to $1,729.5 in 2000. Haying machinery and parts increased 8 percent, from $638.6 in 1999 to $691.4 in 2000.

The value of shipments for commerical turf and ground equipment, including parts, was $1,865.4 million in 2000, a 13-percent increase over the $1,656.8 million reported for 1999.

The value of shipment for consumer lawn, garden, and snow equipment, including parts and attachments, was $6,479.2 million in 2000, virturally unchanged from $6,471.4 million in 1999.

Address inquiries concerning these data to Investment Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call Brian Appert, 301-457-4748.

For mail or fax copies of this publication, please contact the Information Services Center, MCD, Washington, DC 20233-6900, or call 301-457-4673.

U S C E N S U S B U R E A U

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U.S. Department of Commerce
Economics and Statistics Administration
U.S. Census Bureau

Table 1. Value of Shipments of Farm Machinery and Lawn and Garden Equipment by Type of Equipment: 1995 to 2000

[Value in millions of dollars]

Product description	2000	1999	1998	1997	1996	1995
Farm dairy machines, sprayers, dusters, elevators, and farm blowers 1/	884.6	816.8	993.6	816.6	839.2	764.7
Planting, seeding, and fertilizing machinery 1/	887.3	752.4	1,091.1	1,154.6	862.3	852.9
Harvesting machinery 1/	1,729.5	1,553.1	3,095.6	3,259.4	2,966.8	2,666.8
Haying machinery 1/	691.4	638.6	848.0	794.8	670.3	729.4
Plows, harrows, rollers, pulverizers, cultivators, and weeders 1/	496.2	464.7	631.2	696.3	542.0	512.5
Commercial turf and grounds care equipment 2/	1,865.4	1,656.8	1,361.6	1,238.8	1,118.5	1,120.3
Consumer nonriding lawn, garden, and snow equipment 3/	2,887.1	3,082.5	2,979.1	3,051.6	2,957.0	3,095.0
Consumer riding lawn, garden, and snow equipment 3/	3,592.0	3,388.9	3,276.8	2,942.9	2,861.0	2,874.3

1/A parts category and a 7-digit product class total from Table 2 has been summed to derive the product group totals.

2/The 7-digit product class total from Table 2 already includes the parts and attachments from this product group.

3/The parts and attachments categories for lawn and garden equipment have been added to the 7-digit product class total from Table 2.

Table 2. Manufacturers' Shipments of Farm Machinery and Lawn and Garden Equipment by Type: 2000 and 1999
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2000 Quantity	2000 Value	1999 Quantity	1999 Value
333111	Farm machinery and equipment, including parts and attachments	(NA)	(X)	11,966,403	(X)	10,266,430
3331111	Wheel tractors (except contractors' off-highway wheel tractors, garden tractors, turf tractors, and motor tillers) and attachments	15	(X)	(D)	(X)	(D)
	Wheel tractors, farm-type (PTO hp)	(NA)	(D)	(D)	(D)	(D)
3331111001	2-wheel drive, including front wheel assist types	6	(D)	(D)	(D)	(D)
3331111006	4-wheel drive, including tractors with, equal size tires, front and rear	3	(D)	(D)	(D)	(D)
3331111011	Attachments for wheel tractors, farm-type	10	(X)	33,428	(X)	33,902
333111C116	Parts for wheel tractors, farm-type	13	(X)	(D)	(X)	(D)
3331113	Farm dairy machines, sprayers, dusters, elevators, and farm blowers	(NA)	(X)	714,397	(X)	680,317
3331113 pt.	Farm dairy machines and equipment	15	(X)	119,708	(X)	136,046
	Mechanical installations:					
3331113001	Milking machines, complete, suspended and floor-type bucket, single and double units	3	(D)	(D)	(D)	(D)
3331113004	Pipeline milking units, complete, including claws, shells, inflations, air tubes, with or without pulsator	5	(D)	(D)	(D)	(D)
	Other farm dairy machines and equipment	13	(X)	(D)	(X)	(D)
	Attachments for farm dairy machines and equipment	6	(X)	(D)	(X)	(D)
	Parts for farm dairy machines and equipment, replacement units only	9	(X)	61,871	(X) r/	42,170
3331113 pt.	Sprayers and dusters	63	(X)	545,346	(X)	491,045
	Power sprayers, field and row crop types only:					
3331113016	Self-propelled	13	c/ 3,242	c/ 338,701	b/ r/ 3,041	a/ r/ 287,461
3331113021	Tractor mounted	26	a/ 7,903	a/ 16,517	a/ 6,933	a/ 12,681
	Other than tractor mounted:					
3331113024	Power take-off driven, piston pump type	8	900	4,218	b/ 884	4,995
3331113028	Nonpiston pump type	15	a/ 2,932	b/ 9,170	2,663	a/ 8,192
3331113032	Other power sprayers, over 4 g.p.m.	8	(X)	(D)	(X)	r/ 3,250
	Power sprayers, other than row crop and field types, over 4 g.p.m.:					
331113036	Power take-off driven	6	b/ 534	b/ 4,761	545	4,326
3331113041	Engine-driven	13	b/ 1,199	b/ 4,672	1,090	5,353
3331113044	Air carried type power sprayers (field, row crop, and orchard types)	5	b/ 825	b/ 7,448	b/ 539	b/ r/ 6,166
3331113048	Foggers and mist sprayers portable	4	(D)	(D)	a/ 12,020	b/ 1,906
3331113052	Hand-pulled and garden-type,4 g.p.m. and under	10	96,573	12,109	r/ 92,720	12,044
	Sprayers, agricultural hand:					
3331113056	Under 1 gallon	4	756,108	3,799	700,383	3,528
	1 gallon and over:					
3331113061	Compressed air or gas	6	7,885,939	101,813	r/ 7,909,451	99,319
3331113064	Other, including knapsack, hose end and flame sprayers and sprayer pumps	7	(X)	16,661	(X)	20,187
3331113068	Dusters, power, hand, all types	6	68,464	848	92,101	1,282
3331113072	All other sprayers	12	(X)	a/ 3,373	(X)	a/ r/ 4,145
3331113076	Attachments for sprayers and dusters	16	(X)	13,951	(X)	a/ r/ 16,210
333111C223	Parts for sprayers and dusters, replacement units only	34	(X)	a/ 99,997	(X)	a/ r/ 88,693

Continued

Table 2. Manufacturers' Shipments of Farm Machinery and Lawn and Garden Equipment by Type: 2000 and 1999
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2000 Quantity		2000 Value		1999 Quantity		1999 Value
3331113 pt.	Farm elevators and blowers	28	(X)		49,343		(X)		53,226
	Farm elevators, portable:								
3331113081	Single and double chain	9	1,932		4,223	a/	2,185		4,262
3331113088	Auger type	10	7,679		20,617	r/	7,131	r/	19,703
	Other farm portable and stationary augers and elevators	10	(X)	b/	15,987		(X)	a/ r/	17,519
3331113092	Other farm blowers, including forage blowers, combination grain and forage blowers	5	(X)	c/	2,231		(X)	c/ r/	3,579
	Attachments for farm elevators and blowers	10	(X)		6,285		(X)	r/	8,163
	Parts for farm elevators and for grain and forage blowers, replacement units only	18	(X)		8,383		(X)	a/ r/	5,640
3331117	Planting, seeding, and fertilizing machinery	122	(X)		753,678		(X)		638,157
3331117001	Corn planters, corn and cotton planters, and lister plant pull-type and mounted (total rows mounted)	10	(D)		(D)		(D)		(D)
3331117008	Grain drills (fixed frame), all types	12	4,962		94,857		5,703		100,496
3331117011	Transplanters (pull-type or mounted) and broadcast seeders (end-gate, mounted and drawn)	9	a/ 9,651		6,548	b/	9,800		7,624
	Fertilizer distributors (pull-type or mounted):								
3331117018	Dry, including lime spreaders	28	a/ 14,459	b/	29,055	a/	14,440	b/	27,683
3331117021	Liquid and anhydrous ammonia	17	7,478		20,319	c/	5,165	b/	18,547
3331117028	Manure spreaders, rear discharge	12	3,986		25,320		2,933		19,914
3331117031	Manure spreaders, side discharge	7	2,684		28,231		2,678		29,465
3331117038	Manure pumps, liquid	10	767		3,866		1,088	r/	4,699
3331117041	Front and rear tractor mounted loaders (farm-type), manure and general utility (except beet and sugar cane loaders)	12	a/ 33,793	a/	95,899	r/	35,245	r/	101,068
3331117048	Row crop unit planters (quantity in rows)	10	32,719		40,082		27,156		27,999
3331117051	Other planting, seeding, and fertilizing machinery	30	(X)		(D)		(X)		(D)
3331117058	Attachments for planting, seeding, and fertilizing machinery	28	(X)		48,712		(X)	a/	38,811
333111C229	Parts for planting, seeding, and fertilizing machinery, replacement units only	66	(X)		133,610		(X)		114,205
3331119	Harvesting machinery	70	(X)		1,534,619		(X)		1,370,426
3331119001	Combines (harvester-threshers), grain-types only (self-propelled and pull-type)	9	(D)		(D)		(D)		(D)
3331119011	Small grain header for combines, all sizes	7	(D)		(D)		(D)		(D)
3331119021	Corn heads, all sizes	5	(D)		(D)		(D)		(D)
3331119031	Other grain-type combines	2	(X)		(D)		(X)		(D)
	Field forage harvesters:								
3331119041	Shear bar, self-propelled type and pull-type (basic machines)	4	b/ 1,743	b/	38,010	b/	1,130	b/	22,907
3331119051	Attachments for shear bar type forage harvester	4	(X)		(D)		(X)		(D)
3331119061	Flail-type (horizontal knives or vertical free-swinging knives or hammers), including discharge spouts	2	(D)		(D)		(D)		(D)
3331119071	Other harvesting machinery, including potato diggers, cane harvesting equipment, and picker-shellers	47	(X)		(D)		(X)		(D)
3331119081	Attachments for harvesting machinery, including platform and seeder, reel, straw spreaders, load levelers, weed stripper, grate unit, knife grinders, and stalk walkers	23	(X)		98,455		(X)		66,623
333111C22A	Parts for harvesting machinery, replacement units only	53	(X)		194,883		(X)	r/	182,625

Continued

Table 2. Manufacturers' Shipments of Farm Machinery and Lawn and Garden Equipment by Type: 2000 and 1999
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2000 Quantity		2000 Value		1999 Quantity		1999 Value
333111A	Haying machinery	37	(X)		613,865		(X)		545,503
333111A001	Mowers, cutter bar type, including drum and disk	7	2,921		13,996		3,174		18,165
333111A011	Mower-conditioners and windrowers with conditioner auger and draper-type (pull-type and self-propelled)	7	12,947		198,646		12,082		176,322
333111A021	Rakes, side delivery, cylinder type, and finger wheel type	12	9,111	a/	34,592	a/ r/	8,884	a/	34,407
333111A031	Hay balers, hay stackers, (field type), hay bale loaders, bale throwing attachments	18	19,392		320,055		15,959		273,400
333111A041	Other haying machinery	13	(X)		(D)		(X)	a/	22,024
333111A051	Other attachments for haying machinery (stripper, bale chute and knife attachments)	10	(X)		(D)		(X)		21,185
333111C22C	Parts for haying machinery, replacement units only	20	(X)		77,581		(X)		93,103
333111E	Plows, harrows, rollers, pulverizers, cultivators, and weeders	(NA)	(X)		387,306		(X)		357,338
333111E pt.	Plows (primary tillage equipment)	65	(X)		130,714		(X)		120,360
333111E001	Subsoilers, deep tillage	26	4,318		34,462	c/	4,256	c/	32,030
333111E009	Terracing and ditching plows	9	232	a/	436	b/ r/	257	a/ r/	609
	Chisel plows, deep tillage (chisel or sweep type):								
333111E011	Pull-type	13	914		11,349		(D)		(D)
333111E019	Mounted	11	649	b/ c/	4,783		(D)		(D)
333111E021	Other plows (except snow plows)	15	(X)		33,769		(X)		23,646
333111E059	Middlebusters and disc bedders	14	3,636		4,086		4,077	r/	3,146
333111E031	Attachments for plows (coulters, jointers, root cutters subsoilers, fertilizer distributors, etc.), excluding lister planting attachments	22	(X)	b/	34,603		(X)	b/	35,700
333111E039	Plowshares (quantity in thousands of pounds)	7	7,916,203		7,226	a/	8,781,455		9,121
333111C22E	Parts for plows (except plowshares, replacement units only)	21	(X)		44,545		(X)	r/	44,238
333111E pt.	Harrows, rollers, pulverizers and similar equipment (secondary tillage)	88	(X)		169,791		(X)		156,774
333111E041	Spike-tooth harrow sections and spring-tooth and tine-tooth harrow sections	21	17,265		12,945	r/	18,524		14,028
333111E049	Disc harrows, single, tandem, and offset	23	11,766		61,120		11,293		56,813
333111E051	Combination tillage equipment, roller/harrows, disc or coulter/field cultivators, disc or coulter/spring tooth	28	9,135	c/	32,881	c/	9,417		34,641
333111E058	Blade terracers or scrapers (farm-size)	35	49,848	a/	21,933	b/	59,232	a/ r/	25,607
333111E061	Land levelers	7	1,602	a/ c/	2,856	a/ r/	1,338	c/ r/	2,142
333111E069	Other harrows, rollers, pulverizers, and similar equipment	26	(X)		27,651		(X)	a/ r/	16,543
333111E071	Attachments for harrows, rollers, pulverizers, and similar equipment	15	(X)		10,405		(X)		7,000
333111C22G	Parts for harrows, rollers, pulverizers, and similar equipment, replacement units only	41	(X)		36,807		(X)	r/	34,205
333111E pt.	Cultivators and weeders	46	(X)		86,801		(X)		80,204
333111E079	Corn and cotton type cultivators, shank and sweep type (front and rear mounted)	18	1,790	a/	10,227		2,103		11,181
333111E081	Rotary cultivators, ground and power driven	6	1,533	a/	2,971		2,863	a/	6,715
333111E089	Field cultivators	15	5,191		45,247	a/	3,428	a/	37,241
333111E091	Other cultivators and weeders including tool bars (basic units)	17	(X)	a/	5,890		(X)	a/ r/	4,394

Continued

Table 2. Manufacturers' Shipments of Farm Machinery and Lawn and Garden Equipment by Type: 2000 and 1999
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2000 Quantity		2000 Value		1999 Quantity		1999 Value
333111E099	Attachments for cultivators and weeders (front mounting frame, disc weeders, rear section, and drawbars)	21	(X)		22,466		(X)	a/	20,673
333111C22J	Parts for cultivators and weeders, replacement units only	26	(X)		27,525		(X)	r/	28,881
333111G	All other farm machinery and equipment (except parts)	(NA)	(X)		1,589,380		(X)		1,521,571
333111G pt.	Stalk shredders and cutters or rotary mowers (PTO)	41	(X)		207,498		(X)		191,405
333111G002	Flail type (without spout)	14	b/ 1,241	b/	10,688	b/	1,538	a/	11,068
	Horizontal blade type:								
333111G004	66 inches cutting width and under	27	a/ 68,295	a/	46,973	b/	75,230	a/	50,310
333111G006	Over 66 inches up to 100 inches cutting width	22	a/ 46,445		71,827	b/	39,982	a/	53,580
333111G008	Over 100 inches cutting width	15	11,581		78,010	a/	10,995	b/	76,447
333111C22L	Parts for stalk shredders, and cutters or rotary mowers (PTO), replacement units only	29	(X)		32,479		(X)	a/	32,754
333111G pt.	Machines for preparing crops for market or for use	73	(X)		251,635		(X)		233,826
333111G012	Feed grinders and crushers, power	11	1,759		22,770		1,921		18,067
333111G014	Feed mixers, farm-size, stationary and portable	18	a/ 2,867		54,247	a/	2,903	a/	53,596
333111G016	Combination grinder-mixers	5	(D)		(D)		(D)		(D)
	Dryers (grain, hay, and seed):								
333111G018	Heated air crop dryers	16	6,512		41,816	a/	6,070		41,074
333111G022	Crop drying fans (over 15,000 c.f.m. at approximately 1-inch pressure)	10	(D)		(D)		(D)		(D)
333111G024	Other machines for preparing crops for market or for use	43	(X)		99,824		(X)	a/	98,345
333111G026	Attachments for machines for preparing crops for market or for use	15	(X)		13,252		(X)		4,701
333111C22N	Parts for machines for preparing crops for market or for use, replacement units only	41	(X)		42,376		(X)		29,269
333111G pt.	Farm poultry equipment	37	(X)		266,113		(X)		309,547
333111G028	Incubators, quantity represents egg capacity in thousands	10	c/ 64,720	b/	39,228	r/	58,390	a/	26,717
333111G032	Brooders, floor and hanging (gas, electric, oil, coal, wood and battery)	11	143,552		24,210		165,433		24,708
333111G034	Nests and cages	10	3,386,430	a/	52,458	c/	3,608,468	b/	70,115
333111G036	Poultry feeders (trough, hanging, and mechanical) and waterers (except turkey feeders and waterers)	13	6,446,749	a/	64,907	c/	9,131,620	a/	70,870
333111G038	Other farm poultry equipment, including turkey waterers, mechanized egg graders and egg washers	18	(X)		75,362		(X)	a/	105,173
333111G042	Attachments for farm poultry equipment	12	(X)		9,948		(X)		11,964
333111C22P	Parts for farm poultry equipment, replacement units only	15	(X)		20,215		(X)	a/	17,981
333111G pt.	Hog equipment	48	(X)		118,993		(X)		126,434
333111G044	Feeding equipment	26	119,929		41,680	r/	106,976	r/	39,856
333111G046	Handling equipment	15	a/ 464,176	a/	41,372	b/ r/	496,242	b/ r/	41,593
333111G048	Watering equipment	19	405,151		3,781		419,553	a/	3,959
333111G052	Other hog equipment	25	(X)		30,806		(X)	b/ r/	40,158
333111G054	Attachments for hog equipment	10	(X)		1,354		(X)		868
333111C22T	Parts for hog equipment, replacement units only	18	(X)		6,307		(X)	r/	5,041
333111G pt.	Other barn and barnyard equipment	89	(X)		180,993		(X)		180,970
333111G056	Silo and grain bin unloaders, forage and grain, including sealed storage unloaders (farm-type)	15	33,832		42,546	r/	38,788	r/	47,365
	Cattle and dairy barn equipment:								
333111G058	Feeding equipment	32	111,937	a/	23,996		116,007	b/	25,916

Continued

Table 2. Manufacturers' Shipments of Farm Machinery and Lawn and Garden Equipment by Type: 2000 and 1999
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2000 Quantity	2000 Value	1999 Quantity	1999 Value
333111G062	Handling equipment	34	b/ 662,015	b/ 47,415	c/ r/ 576,913	b/ 43,153
333111G064	Water equipment	23	278,263	26,072	244,206	23,160
XXX	Other barn and barnyard equipment	37	(X)	36,057	(X) a/ r/	36,494
333111G068	Attachments for barn and barnyard equipment	15	(X)	4,907	(X) r/	4,882
333111C22U	Parts for barn and barnyard equipment, replacement units only	26	(X)	16,116	(X) a/ r/	25,685
333111G pt.	Farm wagons, and other farm transportation equipment	66	(X)	157,675	(X)	154,095
333111G072	Wagons (chassis only) and trailer gears, excluding motor trucks, 4-wheel	31	a/ 19,934	b/ 41,500	a/ r/ 19,043	b/ r/ 35,685
	Boxes and racks for mounting on wagons and trailer gears:					
333111G074	Manual unloading or dump	8	1,380	9,620	1,666	9,171
333111G076	Gravity unloading, grain-type only	8	5,240	a/ 8,581	5,805	9,691
333111G078	Power unloading	11	a/ 3,192	a/ 28,596	a/ 3,703	a/ 31,954
333111G082	Boxes with integral running gear, grain- and forage-types	13	3,325	22,522	3,710	22,655
333111G084	Other farm transportation equipment	19	(X)	a/ 45,634	(X)	b/ 43,671
333111G086	Attachments for farm transportation equipment	9	(X)	a/ 1,222	(X)	a/ 1,268
333111C232	Parts for farm transportation equipment, including operator cabs for farm tractors	35	(X)	(D)	(X)	(D)
333111G pt.	Irrigation systems	14	(X)	406,473	(X)	325,294
333111G088	Self-propelled irrigation systems, center-pivot (quantity is in ten-tower equivalents)	7	9,901	304,641	a/ 8,617	286,478
333111G092	All other systems using 100-feet flexible hose feeder line and over	9	(X)	101,832	(X)	38,816
333111C22V	Parts for irrigation systems, replacement units only	7	(X)	(D)	(X)	(D)
333111J	Commercial turf and grounds care equipment, including parts and attachments	(NA)	(X)	1,865,440	(X)	1,656,772
333111J pt.	Commercial turf and grounds mowing equipment	48	(X)	1,486,890	(X)	1,347,982
333111J001	Powered nonriding mowers	18	82,271	131,223	81,399	118,172
333111J006	Riding reel-type turf mowers, including greens mowers	7	a/ 19,889	302,802	b/ 20,663	b/ 311,657
333111J011	Riding rotary turf mowers	21	111,040	709,661	97,734	a/ 641,511
333111J016	Gang rotary cutting units, reel and rotary, individual sections	8	(D)	(D)	42,039	a/ 72,269
333111J021	Flail mower cutting units, including gang	6	(D)	(D)	1,755	10,320
333111J026	Other mowing equipment	11	(X)	59,766	(X)	a/ 35,670
333111J031	Parts for commercial turf and grounds mowing equipment	33	(X)	136,283	(X)	a/ 118,396
333111J036	Attachments for commercial turf and grounds mowing equipment	20	(X)	41,064	(X)	39,987
333111J pt.	Other commercial turf and grounds care equipment	48	(X)	378,550	(X)	308,790
333111J041	Sod cutters and sod harvesters	4	(D)	(D)	(D)	(D)
333111J046	Seeders, spreaders, and top dresser attachments	9	1,070,913	29,470	r/ 696,985	a/ r/ 22,945
333111J051	Aerators, spikers, and pluggers	17	18,856	45,117	11,972	28,773
333111J056	Dethatchers	11	8,754	6,315	r/ 6,785	4,936
333111J061	Power brooms, blowers, vacuums, and sweepers	15	18,071	25,514	19,381	23,915
333111J066	Irrigation systems (except agricultural and residential)	2	(D)	(D)	(D)	(D)
333111J071	Other commercial turf and grounds care equipment, including trap rakes, transport trailers and turf tractors and trucks	26	(X)	180,845	(X) a/ r/	137,621

Continued

Table 2. Manufacturers' Shipments of Farm Machinery and Lawn and Garden Equipment by Type: 2000 and 1999
[Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2000 Quantity	2000 Value	1999 Quantity	1999 Value
333111J076	Parts for other commercial turf and ground care equipment	23	(X)	17,093	(X) a/	17,547
333111J081	Attachments for other commercial turf and ground care equipment	17	(X)	43,142	(X)	42,844
333112	Lawn and garden equipment	(NA)	(X)	6,479,171	(X)	6,471,443
3331121 pt.	Consumer nonriding lawn, garden, and snow equipment	44	(X)	2,713,815	(X)	2,833,031
	Lawnmowers:					
	Push-type: reel (powered and non-powered) rotary - gas powered	16	4,119,221	568,823	r/ 4,135,613	565,719
3331121006	Rotary, self-propelled, gas-powered	18	2,277,975	615,339	r/ 2,580,952	679,200
3331121021	Electric, all types, including battery-powered	5	(D)	(D)	(D)	(D)
3331121026	Rotary garden motor tillers	13	530,273	179,365 a/ r/	474,693	194,080
3331121031	2-wheel tractors walking type (except rotary tillers)	2	(D)	(D)	(D)	(D)
	Snow throwers (snow blowers) (except attachment-type):					
3331121036	Single stage	8	b/ 486,710	b/ 137,925	b/ 402,551 a/ r/	120,203
3331121041	Dual stage	9	b/ 439,633	a/ 247,622	b/ r/ 453,559	b/ 276,884
	Powered lawn edgers/trimmers:					
3331121046	Fixed blade	14	b/ 527,525	b/ 96,193	a/ r/ 1,101,441 a/ r/	149,720
3331121051	Other than fixed blades	11	7,076,993	408,056	r/ 6,977,851 r/	358,037
3331121056	Shredders and shredder-grinders	6	(D)	(D)	(D)	(D)
3331121061	Yard vacuums and blowers	9	2,327,552	156,616	r/ 2,842,310 r/	191,548
3331121066	Other consumer nonriding lawn, garden, and snow equipment	16	(X)	c/ 198,649	(X) c/ r/	178,318
3331123 pt.	Consumer riding lawn, garden, and snow equipment	18	(X)	2,805,481	(X)	2,644,400
	Lawn tractors and riding mowers, front engine:					
3331123001	Under 10.0 hp (under 7.5 kW)	1	(D)	(D)	(D)	(D)
3331123011	10.0 hp and over (7.5 kW and over)	9	1,610,912	1,904,830 a/ r/	1,585,978	1,877,040
	Lawn tractors and riding mowers, rear engine:					
3331123021	Under 10.0 hp (under 7.5 kW)	5	(D)	(D)	(D)	(D)
3331123031	10.0 hp and over (7.5 kW and over)	12	126,402	201,232 a/ r/	119,506 r/	190,721
	Garden tractors:					
3331123041	Under 16.0 hp (under 12.0 kW)	6	9,204	27,390 c/	7,982	26,957
3331123051	16.0 hp to 19.9 hp (12.0 kW to 14.9 kW)	6	46,545	143,180 r/	55,810	163,271
333113061	20.0 hp and over (15.0 kW and over)	10	166,190	487,586 r/	72,806	337,388
3331123071	Other consumer riding lawn, garden, and snow equipment	3	(X)	(D)	(X)	(D)
3331127 pt.	Parts and attachments for consumer lawn, garden, and snow equipment	(NA)	(X)	959,875	(X)	994,012
	Nonriding:					
3331127001	Parts	29	(X)	a/ 129,579	(X) a/ r/	168,133
3331127011	Attachments	12	(X)	43,736	(X) a/ r/	81,378
	Riding:					
	Parts:					
3331127021	For tractors and riding mowers	24	(X)	365,921	(X) r/	378,637
3331127031	For other equipment	8	(X)	a/ 6,445	(X) c/	9,645
	Attachments:					
3331127041	Rotary mower decks	12	(X)	107,430	(X) a/	133,725
3331127051	Rotary tiller attachments	9	(X)	(D)	(X) b/	12,913
3331127061	Blades, dozer	12	(X)	30,410	(X)	28,846
3331127071	Snow throwers	8	(X)	(D)	(X)	(D)
3331127081	Carts and wagons	10	(X)	29,253	(X)	(D)
3331127091	All other attachments	23	(X)	128,706	(X) a/ r/	125,577

- Represents zero. D Withheld to avoid disclosing data for individual companies. NA Not available. pt. Partial. r/Revised by 5 percent or more from previously published data. X Not applicable.

Note: Percent of estimation of each item is indicated as follows: a/10 to 25 percent of the item is estimated. b/26 to 50 percent of the item is estimated. c/Over 50 percent of item is estimated.

Continued

Table 3. Shipments, Exports, and Imports of Farm Machinery and Equipment: 2000 and 1999
[Quantity in units. Value in thousands of dollars]

Product description	Manufacturers' shipments		Exports of domestic merchandise 1/		Imports for consumption 2/		Apparent consumption	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
2000								
Farm-type wheel tractors	(D)	(D)	32,788	722,072	109,925	1,383,860	(D)	(D)
Sprayers and dusters (except aerial types)	(X)	531,395	(NA)	34,070	(NA)	29,419	(NA)	526,744
Planting machinery and fertilizer distributers, pull-type or mounted	(X)	704,966	18,739	64,688	133,695	33,603	(NA)	673,881
Disc harrows	11,766	61,120	1,096	5,841	67,563	2,113	78,233	57,392
Other harrows, rollers, pulverizers, and similar equipment	82,679	98,266	5,116	5,480	14,345	9,457	91,908	102,243
Combines	(D)	(D)	4,830	349,934	1,263	108,237	(D)	(D)
Other harvesting machines	15,679	495,024	2,407	52,456	5,755	44,756	19,027	487,324
Field forage harvesters	1,807	38,963	1,266	14,889	799	47,597	1,340	71,671
Hay mowers, mower-conditioners and windrowers	143,430	420,140	19,852	52,360	58,229	103,735	181,807	471,515
Other haymaking machines	(X)	(D)	2,106	24,808	7,016	14,529	(NA)	(D)
Balers, including pickup balers	19,392	320,055	10,990	92,296	2,661	15,558	11,063	243,317
Other plows	(X)	88,885	3,959	11,708	34,958	3,363	(NA)	80,540
Cultivators and weeders	12,416	64,335	14,792	18,308	203,368	35,844	200,992	81,871
Machinery for preparing animal feed	(D)	(D)	5,266	41,615	67,397	27,216	(D)	(D)
Other machines for preparing crops for market or for use	(D)	(D)	3,441	22,162	48,465	9,640	(D)	(D)
Farm poultry incubators and brooders	(NA)	63,438	26,960	13,950	38,648	2,760	(NA)	52,248
Nests and cages (poultry equipment	(X)	52,458	115,289	67,956	200,895	11,968	(NA)	(3,530)
Self-propelled irrigation systems, center-pivot	9,901	304,641	2,420	42,738	69	558	7,550	262,461
All other self-propelled irrigation systems using 100 feet flexible hose feeder line and over	22,670	101,832	(NA)	192,811	(NA)	21,242	(NA)	(69,737)
Farm wagons and other farm transportation equipment	41,193	156,453	-	-	102,351	12,652	143,544	169,105
Riding turf mowers and flail and gang mowers	(D)	(D)	18648	61,839	3,484	2,155	(D)	(D)
Snowblowers (snowthrowers)	926,343	385,547	69,200	38,339	12,751	10,130	869,894	357,338
Powered lawn and hedge trimmers	7,604,518	504,249	1,354,900	89,604	4,353,832	206,968	10,603,450	621,613
1999								
Farm-type wheel tractors	(D)	(D)	33,321	743,336	96,892	1,179,618	(D)	(D)
Sprayers and dusters (except aerial types)	(X) r/	474,835	(NA)	41,829	(NA)	22,415	(NA)	455,421
Planting machinery and fertilizer distributers, pull-type or mounted	(X)	627,029	18,682	61,996	230,532	39,396	(NA)	604,429
Disc harrows	11,293	56,813	800	5,221	72,685	3,987	83,178	55,579
Other harrows, rollers, pulverizers, and similar equipment	93,072	92,961	3,000	5,701	18,152	8,116	108,224	95,376
Combines	(D)	(D)	4,124	289,281	2,651	88,542	(D)	(D)
Other harvesting machines	14,379	447,026	3,295	64,209	5,360	40,643	16,444	423,460
Field forage harvesters	1,205	24,012	1,107	13,247	2,139	34,900	2,237	45,665
Hay mowers, mower-conditioners and windrowers	143,001	385,892	21,208	49,049	40,482	80,546	162,275	417,389
Other haymaking machines	(X) r/	56,431	2,056	39,832	8,386	15,012	(NA)	31,611
Balers, including pickup balers	15,959	273,400	3,829	57,799	2,057	12,939	14,187	228,540
Other plows	(X) r/	75,539	3,518	15,380	2,695	2,433	(NA)	62,592
Cultivators and weeders r/	11,470 r/	59,531	23,337	19,763	156,742	35,969	144,875	75,737
Machinery for preparing animal feed	(D)	(D)	4,515	31,566	484,919	24,143	(D)	(D)

Continued

Table 3. Shipments, Exports, and Imports of Farm Machinery and Equipment: 2000 and 1999
[Quantity in units. Value in thousands of dollars]

Product description	Manufacturers' shipments		Exports of domestic merchandise 1/		Imports for consumption 2/		Apparent consumption	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Other machines for preparing crops for market or for use.....	(D)	(D)	3,035	29,744	19,208	4,889	(D)	(D)
Farm poultry incubators and brooders.....	(NA)	51,425	13,553	19,832	73,264	5,575	(NA)	37,168
Nests and cages (poultry equipment	(X)	70,115	91,409	63,216	92,106	16,027	(NA)	22,926
Self-propelled irrigation systems, center-pivot.....	8,617	286,478	1,601	35,483	64	226	7,080	251,221
All other self-propelled irrigation systems using 100 feet flexible hose feeder line and over..... r/	7,274	38,816	(NA)	179,447	(NA)	20,077	(NA)	(120,554)
Farm wagons and other farm transportation equipment..... r/	42,481	152,827	-	-	72,065	10,053	114,546	162,880
Riding turf mowers and flail and gang mowers.....	162,191	1,035,757	20173	70,871	11,168	5,002	153,186	969,888
Snowblowers (snowthrowers)..... r/	856,110 r/	397,087	74,080	41,818	20,840	13,771	802,870	369,040
Powered lawn and hedge trimmers.. r/	8,079,292 r/	507,757	1,293,708	85,895	3,529,503	181,283	10,315,087	603,145

- Represents zero. D Withheld to avoid disclosing data for individual companies. NA Not available. r/Revised by 5 percent or more from previously published data. X Not applicable.

1/Source: Census Bureau report, EM 545, U.S. Exports.
2/Source: Census Bureau report, IM 145, U.S. Imports for Consumption.

Note: For comparison of North American Industry Classification System-based product codes, Schedule B export numbers, and HTSUSA import numbers, see Table 4.

Continued

MICHIGAN FARM NEWS

November 15, 2000

Apple growers face depression

by Paul W. Jackson

It was the worst of times this summer for southwestern Michigan apple growers such as Rodney Winkel, who finds it difficult emotionally to burn fire blight-ruined trees. Situations beyond farmers' control can lead to clinical depression, and economics have left farmers wondering if the Great Depression could have been much worse.

They don't talk about depression much these days in rural coffee shops of southwestern Michigan, where the world's problems seem simplified by farmers' unique tendency toward common sense.

Three generations removed from the Great Depression, however, even casual observers feel the fog that bogs down area apple growers. They are pariahs in their own land, watching non-farming neighbors collect wealth as farmers give them the best of their orchards year after year, generation after generation. If ingratitude were the only thing to contend with, farmers could likely continue. If there were money to be made, they could take comfort in the fact that they're pleasing consumers and government policy-makers alike with their cheap and abundant products. A little profit in this land, after all, would go a long way.

But this year, back-breaking straws form a pile larger than the stacks of dead trees on Rodney Winkel's farm near Watervliet. And whether they choose to vent their feelings over coffee or keep it all inside, plenty of apple growers are in a depression, economically and psychologically.

Winkel, who vows to continue the fight against apple diseases, insulting prices, consumer ignorance, political apathy, environmental extremism and loss of the tools that helped make him one of the most efficient workers in the world, won't talk about it much, either. But as he surveys what remains of his orchard and spies yet another tree that's died, it's apparent. Folks with less fortitude - and more money - would long ago have been left weeping on a therapist's couch. "Every morning my wife and I look out the kitchen window and see more dead trees," Winkel says. "See the ones with the tags? They were marked as dead two weeks ago. The dead ones in between, without the tags, died since then." Winkel's farm is just about at ground zero of the fire blight bomb that's fallen this year, and the body count is rising. Winkel has already pulled out and burned more than 42,000 trees, representing 130 acres of production that, given the economics of the industry, might not be worth replacing.

"We're still hoping for disaster aid money, but that won't even cover the value of the crop for one year," he says. "We might get $22,000, but we'll lose half a million dollars worth of trees and probably a million dollars overall, not to mention losing most of next year's crop, and most of the year after that's crop. It costs anywhere from $9.50 to $11 per tree to replace them, then we wait three to four years for a crop. We don't have the capital to do that. And I'm just one little guy. I think you will see people forced out of farming."

The situation forces a problem for lenders as well.

"The biggest challenge will be getting a handle on what potential income they'll have in this area," said Karl Kincade, senior financial services officer with Greenstone Farm Credit Services in the Berrien

Springs office. "The apple industry here has been turned upside down. Some may be able to limp through 2001, but most expect half a crop. As for emergency aid, we have to wait for the dust to settle. There are just a few variables out there."

If this story seems as old as farming, well, it may be. But remembering grandfather's tales of Great Depression survival - how it made him stronger - doesn't revive spirits much when the farm itself is on the line and depression threatens the family structure.

"There's no question that these kinds of stresses farmers face can produce clinical depression," said Dr. Arnold Werner, M.D., professor of psychiatry at Michigan State University. "And if a person is at all predisposed to depression, these are the kinds of things that can really push him over the edge." Perhaps the one thing that pushes farmers - and southwestern Michigan's apple growers in particular - near the precipice, is lack of control.

"When a person is in a very high-risk situation, with variables he can't control, it leaves him with a sense of helplessness, which magnifies the feelings of depression," Werner said. "You see the same thing with massive factory layoffs. It's the feeling that they've failed, but there's nothing they could have done to prevent it. Then you see the social strains, the increased risk of child neglect, spousal abuse, increased consumption of alcohol. As the capacity to cope goes down, human behavior moves in the direction of easing pain, and that can disable a person from taking steps to solve the problem." The feeling of failure is quite evident in southwestern Michigan these days, even though the farmers hurt most by low prices, fire blight and cheap imports were those who were innovative enough to plant the latest varieties to try to fill fickle consumer tastes. Those varieties most in demand were hardest hit by fire blight, so the most progressive farmers were hurt the worst. And there wasn't much they could do about it. Sprays didn't work. Nothing did.

Rodney's brother Kevin, also an apple grower, was one of the fortunate ones this year. He lost only 1,500 trees. But he didn't harvest anything, choosing instead to cut his losses and work on another avenue of self-employment.

"In mid-May I got plastered real hard with hail," he said. "Three days later, I decided not to spray for harvest. Our accounts showed that we would have only a juice crop, and that costs more to get to harvest than its value would be." Kevin, like his brother, is not about to give up on farming completely. But there are plenty of growers who are contemplating a sale.

"I don't think there's any doubt we'll lose growers and orchards," Kevin said. "Some will probably lose their houses. Some may try vegetables or grain, but they can't afford to sell that for less than their debt, either."

There is a difference for farmers, psychologically, Werner said, between selling to get out from under a losing enterprise and being forced out.

"If a farmer sells and takes care of his debt, at least he can look back and tell himself that that was a good business decision," Werner said. "But if he's forced off, he's suddenly disconnected from his history and his community. It's almost the equivalent of being forced to emigrate in a war."

Looking over the trees lying uprooted and dead in Rodney Winkel's orchard, it's all too clear that there are battles being fought every day. If it's not with prices, it's with migrant laborers wondering if it's worthwhile to come to Winkel's farm next year. Then there are lenders reluctantly telling farmers they're not worth further investment. Apple processors are hurting. Costs keep rising. Fire blight may strike again in the spring. The bullets keep coming, from all directions.

"We just can't take hits like this," Winkel says. "It's all in the gutter, and we don't have a policy to address it."

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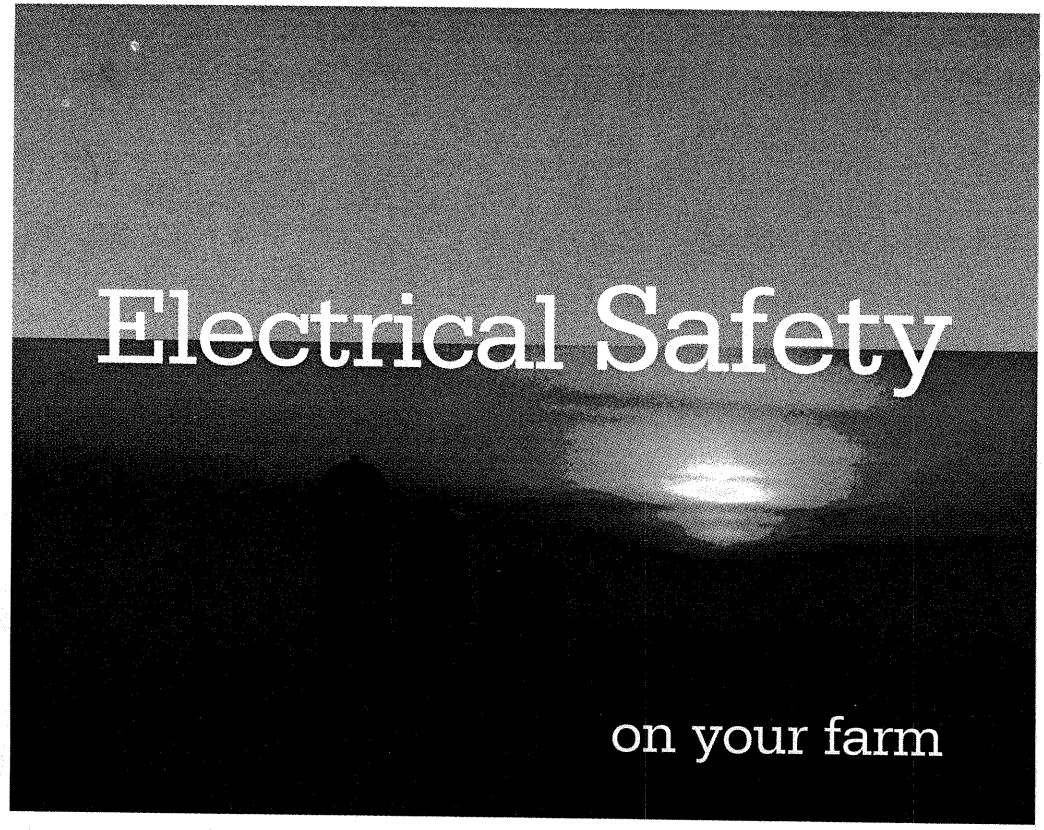

Electrical Safety

on your farm

A guide to safely utilizing the many benefits electricity offers agriculture.

ALLIANT ENERGY

We're on for you.

At the flip of a switch or the push of a button, electricity is always there to help make your farm productive and efficient. It's easy to take the convenience and reliability of electricity for granted, but taking its dangers for granted can be deadly. That's why Alliant Energy is committed to helping farmers work safely around electricity. Your job is important to all of us; our job is to help you do it safely.

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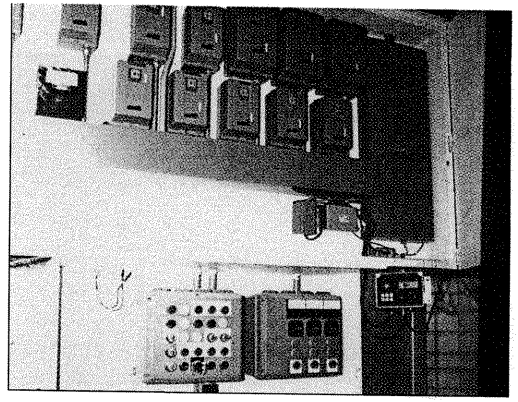
The basics of electrical safety



Most electrical safety rules are common sense, but when you're working around the farm, it's easy to get caught up in a task or distracted by an outside disturbance. Take a moment to review these guidelines, and keep them in mind whenever you're working around electricity.

DO keep all electrical devices, including extension cords, away from animals, water or damp areas.

DO keep all power tools, motors and other electrical equipment in good repair.

DO check equipment cords and plugs frequently for signs of fraying, cracking or scorching.

DO use ground fault circuit interrupter (GFCI) receptacles on all outlets that are outside or near water sources. If there is any variation in the current, the GFCI will automatically cut the flow of electricity through the circuit, greatly reducing the risk of shock.

DO keep all cords neatly secured and out of traffic areas.

DO flag the fuse or breaker switch if you need to turn off the power, so no one else touches it while you're working.

DO call before you dig. Just dial your state's "one call" or Diggers Hotline service at least three days before you start to have underground service lines marked.

- In Iowa, call Iowa One-Call at 1-800-292-8989
- In Illinois, call JULIE Inc. at 1-800-892-0123
- In Minnesota, call Gopher State One Call at 1-800-252-1166
- In Wisconsin, call Diggers Hotline at 1-800-242-8511

DO look up for overhead electrical lines when moving tall equipment.

DON'T cut off the third grounding prong on a plug. The grounding conductor acts as a protection between electrical wire and people or animals near the wire.

DON'T use extension cords, power strips, outlet extenders or "cheater" adapter plugs as permanent fixtures. These devices are designed only for temporary use, and can overheat or overload a circuit, risking an electrical fire.

DON'T oversize fuses. Circuits are designed for a given amount of current.

Familiarize yourself with the location of all overhead and underground power lines, utility equipment like meters and transformers, and the service panel at each of your buildings.

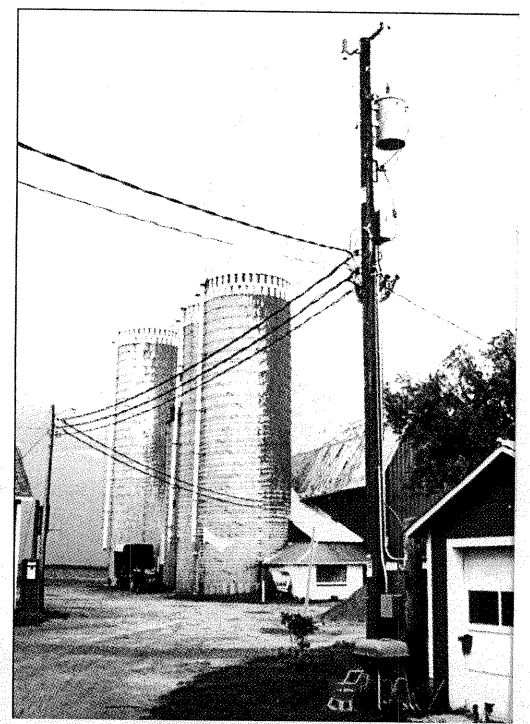
Overhead power lines

Overhead power lines are a significant risk of electrocution on the farm. Always keep in mind that most overhead power lines have no protective insulation – any covering on the wires of a customer's service is only for weatherproofing. In addition, high-voltage lines can sag several feet when they are hot. Allow extra space near high voltage lines; the current can "arc" to conductive materials near the line without contact actually occuring.

- Be aware of power lines whenever you're moving equipment like augers, conveyors, sprayers, bale elevators, hoppers and scaffolds. Try to maintain at least a ten-foot clearance.
- Keep smaller equipment like ladders, poles, rods or irrigation pipes at least ten feet away from overhead power lines.
- If you're planning a new building, contact your Alliant Energy representative or a licensed electrician for help placing electrical service lines.
- Take care when climbing, trimming or cutting trees, especially after a storm. Broken or damaged power lines can send electricity through tree limbs and fences, so use extreme caution with chain saws, axes and pruning poles.
- Do not fly kites or balloons with long strings in the vicinity of power lines.

Grain bin regulations

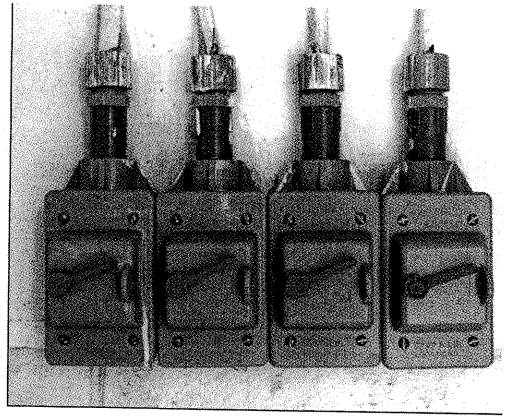
The National Electrical Safety Code requires that power lines must be at least 18 feet above the highest point on any grain bin with which portable augers and other portable filling equipment is used.



Wiring and grounding requirements

The National Electrical Code requires different wiring types and techniques for the three general types of agriculture buildings:

- Damp buildings: High levels of moisture and corrosive dust and gases inside animal housing, milk houses and silos create electrical risks. These buildings require dust- and moisture-tight, non-corroding materials and wiring methods.
- Dusty buildings: Fertilizer, dry grain and hay storage buildings can contain "explosive dust," so they require dust- and ignition-proof wiring.
- Dry building: Machine storage buildings, shops and unattached garages can be wired similar to residential buildings.



Your farm electrical system grounding must be separate from the farm's lightning protection systems.

Proper grounding is also an essential part of a safe electrical system. Grounding systems act to protect people and animals from electric shock, and help reduce the possibility of an electrical fire.

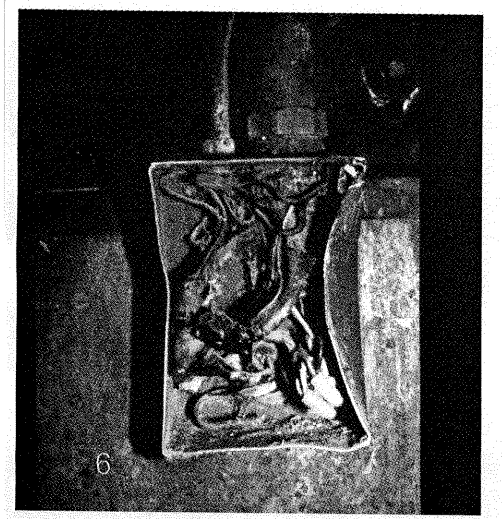
The ground wire in an outlet or switch is usually connected to a water pipe. Your qualified electrician should check that the neutral wire and grounding wire are not connected together at any point in your electrical system other than the main service panel.

Maintaining your electrical system and equipment

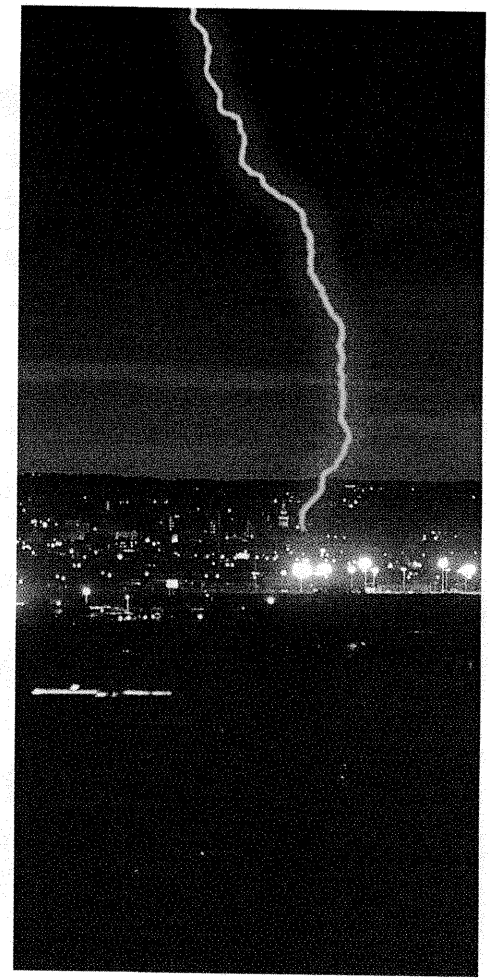
Good maintenance can keep your electrical system and equipment operating safely for years to come – but neglecting it can quickly lead to accidents, fires or costly downtime.

- Keep all electrical equipment and service areas clean. Clear away dust and cobwebs often, and make sure moisture isn't accumulating.
- Make sure all wiring and cords are protected from human and animal contact or damage from equipment (e.g., cords traveling under a heavy storage cabinet).
- Check to see if all fuses in the service panel are the correct size for their circuits.
- Check outlets and switches for loose connections or broken or missing cover plates.
- When replacing light bulbs, make sure the wattage doesn't exceed the fixture's rating.
- Keep high-intensity light fixtures away from combustible materials.

Be sure to turn off and unplug equipment before cleaning or repairing, and cut the power at the service panel when checking outlets, switches and light fixtures.



Lightning protection



Lightning is a major cause of farm fires. A certified lightning protection system can be a good investment for your farm buildings, especially those constructed with metal roofs or siding. These systems provide a direct path to the ground for electricity from a lightning strike, reducing the risk of injuries, fire and surge damage.

A lightning protection system consists of several parts:

- Air terminals (lightning rods): Narrow metal rods attached to building roofs to intercept the lightning.
- Ground terminations: Metal rods driven into the ground.
- Conductors: Aluminum or copper cables that connect the lightning rods to the ground terminations.
- Surge arrestors and suppressors: Devices that protect electrical equipment by absorbing and/or dissipating excess electricity.
- The lightning protection grounding system should be separate from the electrical grounding system.

As with any other electrical system, lightning protection systems should be installed only by a qualified electrician or a vendor certified by the system's manufacturer.

Portable and standby generators

Generators can come in handy if you experience a power outage, but these devices must be used with extreme caution. When purchasing or using this type of equipment, check your local safety codes and read the manufacturer's directions carefully. As a property owner, you are responsible for the safe installation and use of the equipment, and you can be held liable for any injuries or damage.

- Make sure the area is well ventilated. It is recommended that portable generators not be operated indoors. If air isn't circulating, deadly carbon monoxide fumes can quickly build up.
- Generator connections must be done in a manner that generator power cannot get through to the utility system. This is accomplished with a double pole transfer switch. Three phase service requires a three pole switch.
- Try to avoid using extension cords with your portable generator; if you must use them, make sure they're the correct size. Using an undersized extension cord on a large appliance could cause the cord or appliance to overheat, leading to damage to the appliance or even a fire.
- The generator must be rated to have a sufficient wattage for the electrical load it will operate.

Only a qualified electrician should install a permanent standby generator. This will help ensure that the unit is sized properly and wired correctly.

Always read the manufacturer's directions carefully before using a portable or standby generator.

Responding to an electrical emergency

If an electrical emergency occurs, it's important to know how to respond.

Electrical contact accidents

- If someone comes in contact with an energized wire or power line, do not touch the victim until you're sure the current has been turned off - you could become part of the circuit and be injured or killed. Unplug the device or cut power at the service panel first.
- When you're sure the power has been cut, call for emergency assistance. If the victim isn't breathing, administer CPR until help arrives. If the victim is in shock, loosen clothing and keep him or her horizontal and warm. Burns should be treated only by medical professionals.
- Always seek medical help for an electrical contact accident, no matter how minor it appears. Electricity burns from the inside out, so injuries might not be visible. In addition, the heart can be affected several hours later.

Electrical fires

- If possible, unplug the device or shut off the power at the main service panel.
- Never use water on an electrical fire –use a multipurpose fire extinguisher.
- When calling 911, be sure to tell the dispatcher it's an electrical fire.

Downed power lines

- Report downed power lines to your electric company immediately.
- Never let anyone touch or drive over a downed line – even experienced utility personnel can't tell if a line is energized just by looking at it.
- Avoid touching anything a downed line is contacting, especially metal fences and equipment. Remember that the area around the downed line, including the soil, equipment or other objects, could also be energized.
- If a downed line comes in contact with a vehicle, instruct the driver to stay in the vehicle until help arrives. If there is an immediate danger of a vehicle fire, the driver should jump out of the vehicle, landing with both feet together and avoiding touching both the car and the ground at the same time. The driver should then shuffle away from the vehicle without raising their feet.

Safe Farm

Promoting Agricultural Health & Safety

How to respond to farm injuries

Late one summer afternoon, a 28-year-old dairy farmer entered a 10-foot-deep manure pit to replace a shear pin on an agitator shaft. While he was climbing out, he was overcome and fell onto the pit floor. The man's 15-year-old nephew saw what had happened, climbed into the pit and also collapsed. One by one, others entered the pit to help—the boy's father, his cousin, and his grandfather who owned the farm—and all were overcome .

Finally, the owner of a local farm implement business and two workers rescued victims with a rope: they did not go into the pit. The emergency rescue squad arrived 20 minutes after the tragedy began. All five family members died.

This 1989 incident from another state shows how untrained and inexperienced rescuers became victims. It also shows the need to know what to do in an emergency.

According to the Iowa Department of Public Health, 49 Iowans died and 1,670 farm injuries were reported during 1999. Most likely, a family member or another farm worker was first at the scene for those Iowans. If you work or live on a farm, you also could be a first responder and will need to make life-saving decisions that will not put you or the injured victim in further danger.

First response is critical in farm-related injuries. Such injuries often occur in isolated areas and may involve entrapment by farm machinery or in structures that are difficult to enter. A telephone may not be nearby, and the first responder may be alone. Tremendous stress can cause indecisiveness, delay, and incorrect decisions about appropriate action to take.

First responders

The first rule is to keep calm. Fear and anxiety are normal reactions when a severely injured person, possibly a family member, is discovered. Mental preparation and training can help the first responder overcome these emotions and act rationally.

Your primary concerns are to: 1) get professional help for the injured person by activating emergency medical services (EMS); 2) make sure the victim and you are not in further danger, and 3) provide care until EMS arrive. The appropriate action isn't always apparent, and the first responder sometimes must make difficult choices.

Activate EMS

Should you help the victim first or contact EMS? It depends on several factors, such as whether the injured person is breathing. If breathing stops, irreversible brain damage could occur in four to six minutes. You may need to administer cardiopulmonary resuscitation (CPR) before leaving the scene.

If you can, however, activate EMS as soon as possible. A general rule is: the sooner an individual receives advanced medical care, the greater chance of survival. You may quickly get help by flagging down a passing motorist, or sending someone else.

When you call emergency personnel, never hang up until the dispatcher or operator tells you to do so. The dispatcher may start the emergency response procedure and come back for more information.

Provide the following information: 1) the location of the injury (use accurate mileage distances and landmarks that are visible at night and in snow); 2) your name

Emergency response

How much do you know ?

Do you know what to do in an emergency? Review the basics with this quiz.

1. If you discover an injury, your job is to get professional medical treatment to the victim as soon as possible. True or false?

2. When you dial 911, you should:
a) provide details and wait for someone to tell you to hang up.
b) quickly give details and return to the scene.

3. When responding to an injury with a power take-off (PTO) unit, always shut off the tractor but never disengage the PTO. True or false?

4. If you can't shut off power after a possible electrocution, your only choice is to:
a) call the power company.
b) quickly pull the victim away from danger.
c) use a pole and push the victim to safety.

See answers on back.

IOWA STATE UNIVERSITY
University Extension

Pm-1518l Revised October 2000

and telephone number from which you are calling; 3) nature of the injury; 4) the number of victims and conditions; 5) type of aid that was or can be given; 6) whether someone will meet EMS at a remote location, and 7) any special conditions that might hinder rescue efforts, such as a possible gas spill, fire, or electrical wires.

Post detailed directions to your farm at all telephones. Even if you have a "911" system, post numbers for the poison control center and power company. Make sure all family members, especially children, can tell others how to get to your farm.

Return to the scene

After you call emergency personnel, or have decided this was not the first step, control hazards at the scene that could harm you or cause further harm to the injured person. Typical hazards include uncontrolled movement of machinery, fire and explosions, spills of hot liquids or chemicals, exposed electrical wires, and toxic fumes.

Here are general concerns for common types of farm injury situations:

• **Manure storage facilities.** Multiple deaths are common in underground pits because deadly gases can be present in the enclosed area. **Never** enter a pit without a self-contained breathing apparatus. **Never** lower a fan into an underground storage area for added ventilation because sparks from the motor could cause methane gas to explode.

• **Power take-off equipment.** Is the tractor shut off? Always turn off the ignition key on the tractor and shut off the fuel on a diesel tractor. **Do not disengage the PTO.** When tension is released, a PTO can move and cause additional injury to a victim. Remove clothes only if they restrict breathing.

• **Tractor overturns.** Is the tractor stable? An overturned tractor may roll down a slope; on level ground it may be unstable due to a hydraulic system failure. Always approach a tractor from the uphill side where you may still be able to shut off the tractor, eliminate a fire hazard, or help the victim.

• **Grain bins.** Is power to the auger turned off? It takes less than 15 seconds for someone to be buried in grain. If the person is in grain above the knees, do not use a rope because further injuries could result. Ventilation fans will help the victim get air, but vibrations could collapse a grain bridge.

• **Electrocution.** Is the power source disconnected? Never touch an electrocution victim unless power is turned off. Do not try to drag the person to safety with a stick or board because you also risk electrocution.

Wait for EMS

Once you've contacted EMS and done all you can to prevent further danger, provide first aid until emergency personnel arrive. Never move someone with a spinal injury unless in immediate danger because it could result in death or paralysis. Situations that could cause spinal injury include entanglement or entrapment in machinery, being thrown from equipment, or long falls.

The best you can do in an emergency is to remain calm and, if the injured person is conscious, provide assurance. The key is being prepared as a first responder so that you can think rationally and make critical choices to improve the injured person's chances for survival.

Prepared by Charles Schwab, extension safety specialist, and Laura Miller, extension communications. Design by Valerie King. Portions adapted from *First on the Scene*, NRAES-12.

Emergency response

What can you do?

What you do the first few minutes after a farm injury can mean the difference between life and death. To prepare you and your family for such emergencies, follow these tips:

- ☐ Post emergency information at every telephone.
- ☐ Practice making emergency calls.
- ☐ Enroll in first aid and CPR classes.
- ☐ Discuss possible actions to take if you find someone:
  - • entangled in a PTO;
  - • lying in a manure pit;
  - • pinned underneath a tractor;
  - • who possibly has been electrocuted;
  - • caught inside grain.
- ☐ Place a first aid kit in each tractor, the home and workshop.

Answers to quiz: 1-True; 2-a; 3-True; 4-a.

For more information

This publication did not address the technical aspects of emergency response. Adult family members and full-time farm workers should receive training in first aid and CPR. To inquire about classes, contact the American Red Cross, American Heart Association, or local fire departments and hospitals. Two other helpful publications include:

■ *First on the Scene*, NRAES-12, available at any extension office for $7.

■ *NIOSH Alert: Preventing Deaths of Farm Workers in Manure Pits*, NIOSH #90-103, free from the National Institute for Occupational Safety and Health, 4676 Columbia Parkway, Cincinnati, Ohio 45226, or 1-800-35-NIOSH.

Safe Farm

Safe Farm is an Iowa State University Extension project helping to make Iowa farms a safer place to work and live.

File: Health and Safety 1
Check the World Wide Web at:
http://www.ae.iastate.edu/safety.htm
for more information.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Stanley R. Johnson, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.

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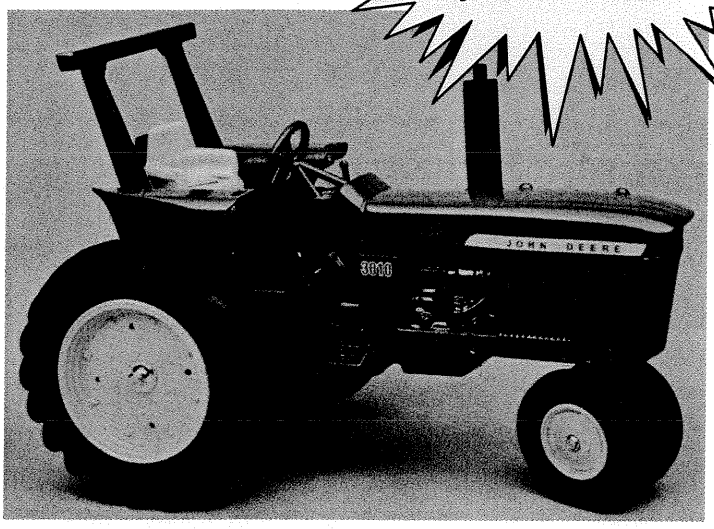

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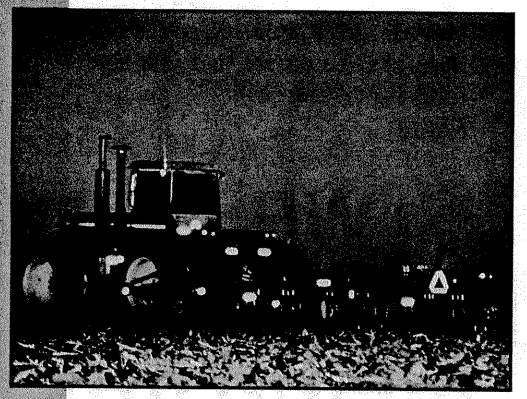

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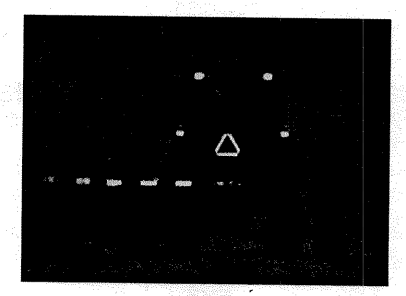

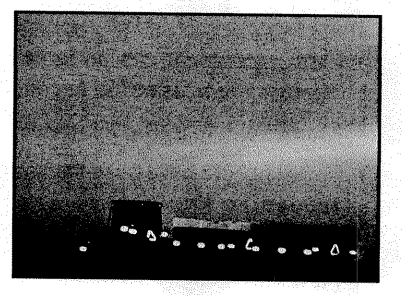

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- Growmark, Inc.
- Illinois Department of Transportation
- Illinois Farm Bureau
- Illinois Fertilizer and Chemical Association
- Illinois Grain and Feed Association
- Illinois Network for Agriculture Safety and Health
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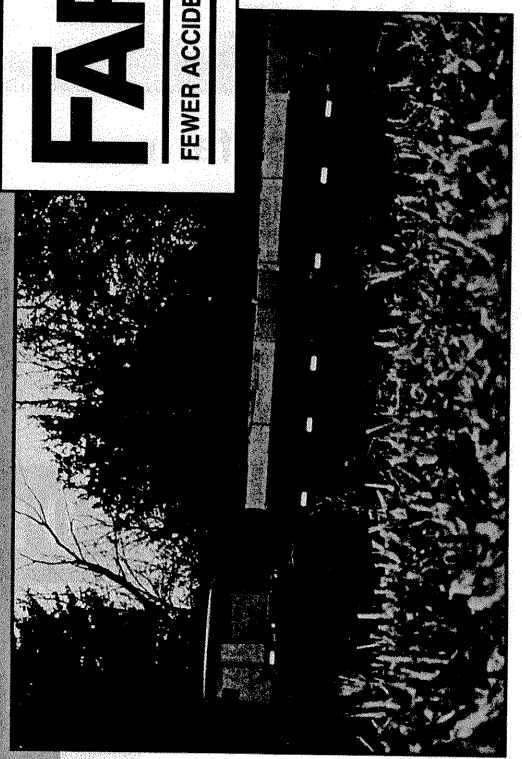


FARM

is a voluntary program to encourage farm operators to apply new retroreflective and fluorescent material to their equipment in a standardized and recognizable manner in an effort to reduce the number of farm equipment accidents on rural roadways.

ILLINOIS DEPARTMENT OF TRANSPORTATION SEVEN YEAR STATISTICS...

Number of farm related highway accidents 2334

Number of persons injured 1011

Number of fatalities 43

These factors increase the odds that *YOU* will be involved in a rural highway farm machinery accident...

- Slow moving vehicle emblems that are faded do not attract the attention of approaching motorists.
- Farm equipment without side markings may not be seen, especially in low light conditions.
- Farm equipment can be large and extend into the opposing lane of traffic beyond the tractor.
- Motor vehicle traffic increases yearly.
- Fewer people have farm backgrounds, and so do not recognize that caution should be used when approaching farm equipment on the roadway.
- Farms are larger than in the past, and farm operators are forced to travel greater distances on the highways between fields.

WHY SHOULD YOU PARTICIPATE?

- You have worked hard for what you have, and this is one way of protecting your investment.

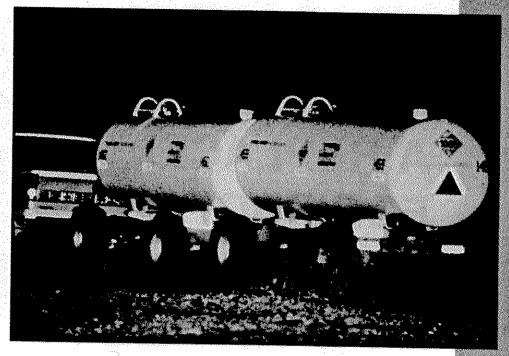
WHAT CAN YOU DO?

- Go to your local equipment dealer, grain elevator, or fertilizer and chemical provider and ask if they support the FARM program and have kits available to mark your equipment.
- Marking all the equipment that you use on the highway will reduce your risk of being involved in a machinery related rural highway accident.
- Adding additional marking from the FARM kit will improve visibility of your equipment.

NOTICE

- There are several different grades of reflective and fluorescent materials on the market today. The FARM kits contain high quality, durable materials. To ensure that you are receiving the best quality, ask for the FARM kit by name.

WE LOOK FORWARD TO SEEING YOU!



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