

This presentation is part of an educational modular program designed to provide new and beginning farmers and ranchers with relevant information to initiate, improve and run their agricultural operations



United States Department of Agriculture
National Institute of Food and Agriculture

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Beginning Farmer and Rancher
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USDA-NIFA-BFRDP 2010-03143



Farm Safety



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Farm Safety



Because of the vast amount of material that can be included in this topic, we have only included a general overview of farm safety concerns

For each of these subjects there is much more information available from other resources that will go into more detail

We have included a list of helpful information sites on the internet at the end of these presentations

Farm Safety



Because there are many important topics to discuss related to farm safety, we have split this topic into 4 (four) different presentations

Farm Safety 1 = Tractors, equipment, tools, electricity and lifting

Farm Safety 2 = Livestock, chemicals, toxic gases and dust

Farm Safety 3 = Weather and Fire

Farm Safety 4 = Slips/trips/falls, highway traffic, noise, enclosed spaces, manure pits, pond/water, wells

You can read the presentations in any order that you want
but we strongly recommend that you read them all

Farm Safety 1

**Tractors
Machinery/equipment
Hand tools
Electricity
Lifting**

Farm Safety 2

**Livestock
Chemicals
Toxic gases
Dust**

Farm Safety 3

**Weather
Fire**

Farm Safety 4

**Slips/trips/falls
Highway traffic
Noise
Enclosed spaces
Manure pits
Pond/water
Wells**

Why is it important to talk about Farm Safety?



We have all heard the stories of the retiree that wants to go into farming because it will be relaxing and easy

The office employee that thinks that farming is stress-free

The family that want to start a farm because they want to spend time outdoors



However farming is not a hobby

- It is very physically demanding and is considered to be one of the most dangerous professions
- It has a very high injury rate
- Fatality rate of 25.1/100,000
- Most injuries can be permanent



List of most dangerous jobs (2009)



1. Fishers and related fishing workers



2. Logging workers



3. Farmers and ranchers



4. Structural iron and steel workers



5. Aircraft pilots and flight engineers



Farming can be more dangerous than:

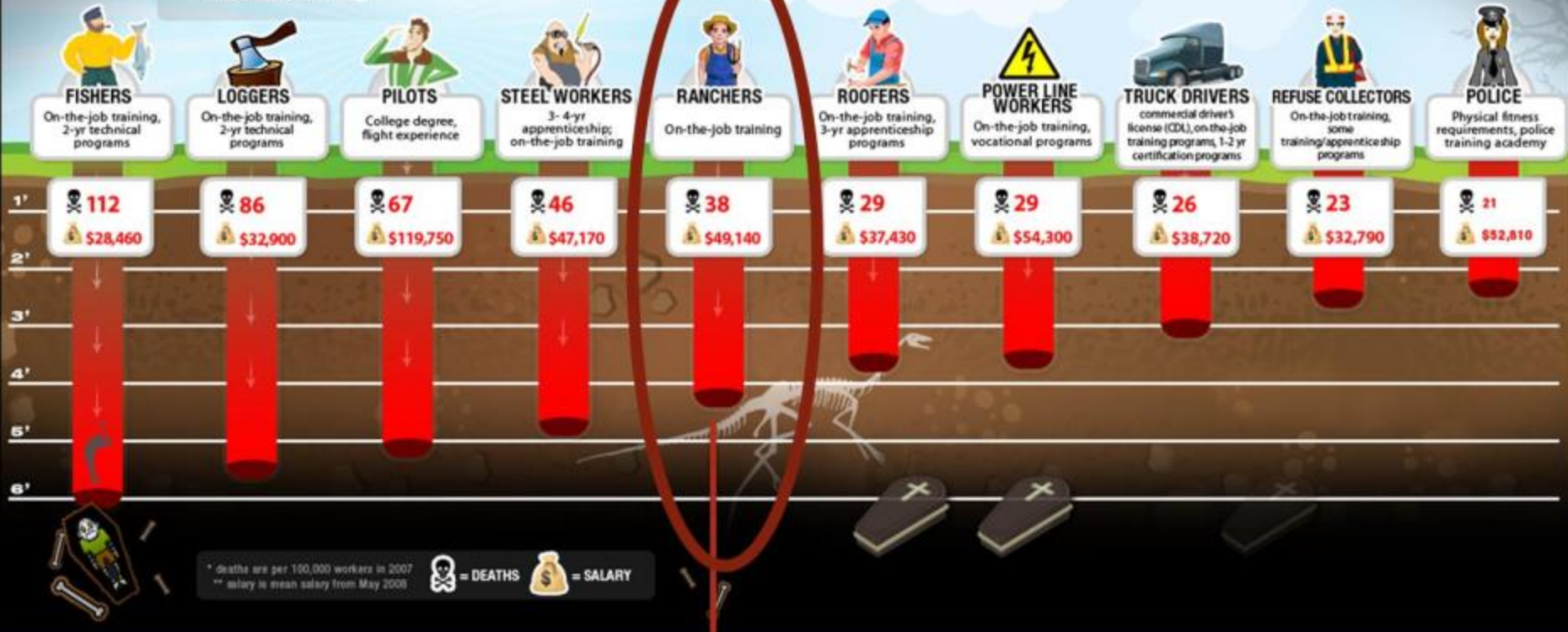


The 10 Deadliest Jobs in the US

2007

EarnMyDegree.com

Here are the 10 most dangerous jobs in America. Each profession is depicted along with educational/training requirements, mortality rate and median salary.



It doesn't make sense that being such an important element in our society and such a dangerous job, that there aren't more training programs and support for new and beginning farmers

Farming is one of the few industries in which the whole family is at risk for fatal and non fatal injuries

<http://www.chaffinfamilyorchards.com/about.php>



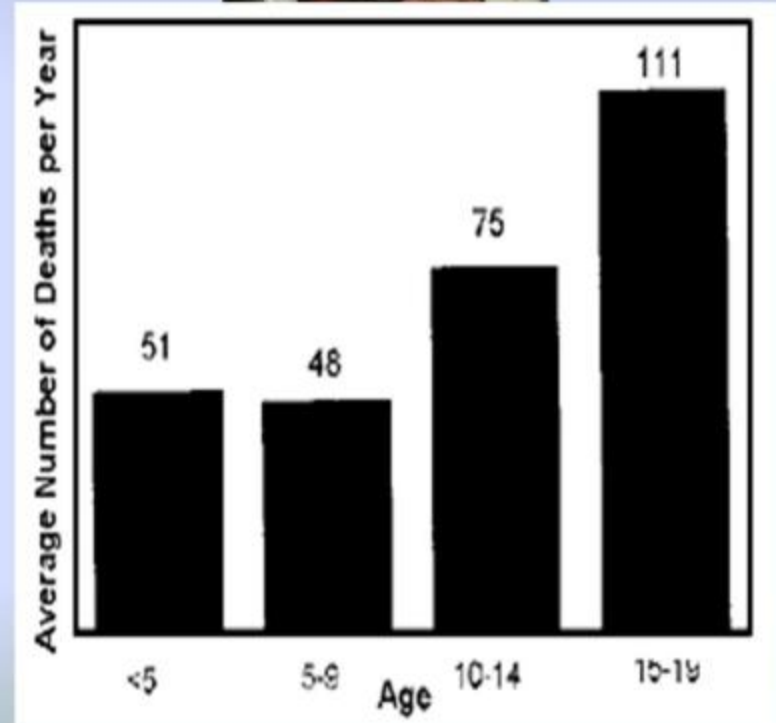
<http://www.ediblesadvocatealliance.org/sustainable-learning-journey-blog/>

Alphabetical listing of recognized Safety and Physical hazards, Biological and Chemical Hazards and Diseases pertaining to agriculture

Safety and Physical Agents:	Biological and Chemical Agents:	Agricultural Diseases:
<p>Commodity storage & transfer</p> <p>Electricity</p> <p>Ergonomics</p> <ul style="list-style-type: none"> Back injury Lifting Repetitive trauma <p>Farm machinery</p> <ul style="list-style-type: none"> Balers Chain saws Combines Power take-off (PTO) Roll-over protection Safety guards Tractors <p>Fire</p> <p>Fuel storage (leaks and fires)</p> <p>Illumination (poor lighting)</p> <p>Lightning (shock and fire)</p> <p>Liquefied Propane [LP] gas</p> <p>Liquefied anhydrous ammonia</p> <p>Livestock handling injuries</p> <p>Physical/environmental hazards</p> <ul style="list-style-type: none"> Noise Thermal (heat and cold) Ultraviolet (sun light) Vibration Psychological stress Sanitation (field) Transportation (on & off road) Welding 	<p>Asphyxiation/suffocation</p> <ul style="list-style-type: none"> Confined space Entrapment (see commodity s.&t.) Fumigation Carbon Monoxide (combustion) Silo gases (NO₂ and CO₂) <p>Detergents</p> <p>Diesel exhaust</p> <p>Disinfectants including</p> <ul style="list-style-type: none"> Chlorine Quaternary ammonia compounds Organic iodides Cresol-based compounds Formaldehyde emitters <p>Dusts (inorganic aerosols)</p> <p>Hydrogen sulfide (a key manure gas)</p> <p>Microbiologic organisms</p> <ul style="list-style-type: none"> Infectious microbes Mold spores (mycotoxins) Noninfectious bioaerosols Parasites <p>Nitrogen dioxide (silos & welding)</p> <p>Organic dusts - e.g.</p> <ul style="list-style-type: none"> Cotton dust Endotoxin (on many organic d.) Grain dust Sugar cane (bagassosis) Wood dust <p>Pesticides (including application and harvest activities)</p>	<p>Arthritis</p> <p>Dermatoses - caused by</p> <ul style="list-style-type: none"> Heat Irritant chemicals Infectious microbes Insects Sensitizing chemicals Sunlight <p>Noise Induced Hearing Loss</p> <p>Immunologic diseases</p> <ul style="list-style-type: none"> Allergic rhinitis Asthma Dermatoses <p>Noninfectious diseases</p> <ul style="list-style-type: none"> Cancer (is actually a low risk) Hypertension and heart Respiratory diseases Asthma (also immunologic dis.) Bagassosis (from sugar cane) Bronchitis Byssinosis (from cotton dust) Farmer's Lung (see also HP below) Hypersensitivity pneumonitis Organic dust toxic syndrome (ODTS) Pneumoconiosis (e.g. silicosis) Silo filler's disease (see also NO₂) <p>Organophosphate poisoning and sequelae</p> <p>Silo unloader's disease</p> <p>Zoonotic diseases</p>

Children safety

- Farm injuries are particularly high among children:
 - Between 100 to 300 youth die on farms annually
 - Children often work on the family farm
 - Children will play on equipment
 - Because children are always present, parents can become complacent



A good website to go for more information and details on farm safety is:



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OSHA

Occupational safety and health administration

<http://www.osha.gov/>

The OSHA website has important free information and fact sheets on how to safely perform many common farm activities



Farm Safety

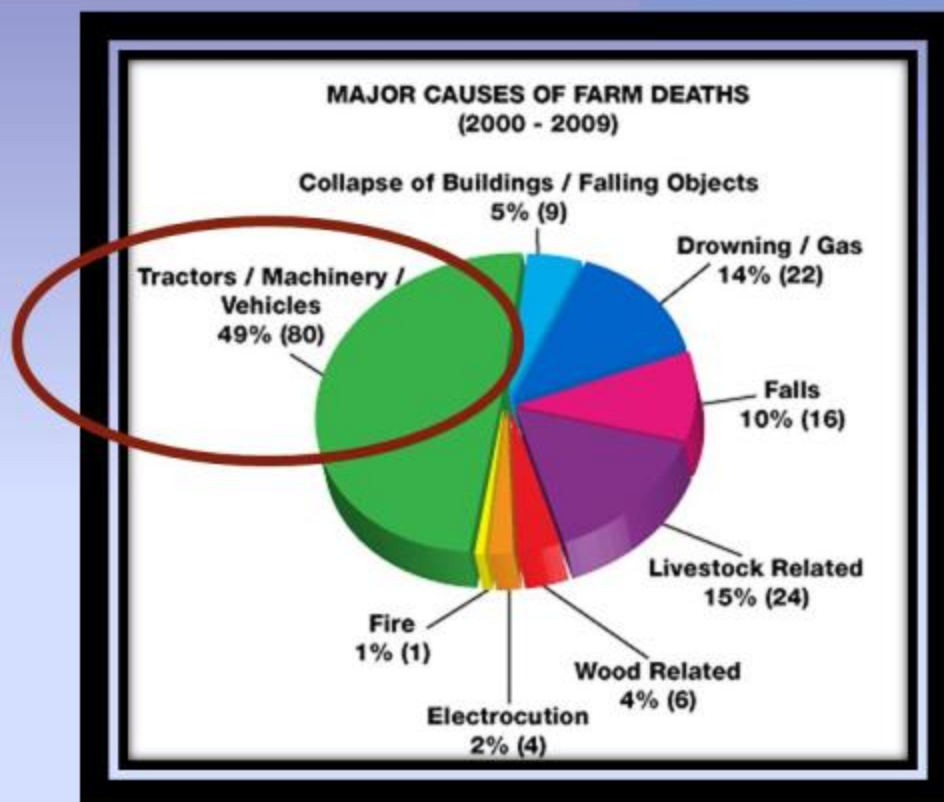


- **Always Call 911 if there is an emergency**
- Owner/operators should take at a minimum a first aid course, which includes CPR





Tractors



Machinery, Equipment
and Tractors are the most common
causes of farm deaths

Machinery/Equipment/Tractors



Entire books can be written on machinery and tractor safety

But some things you need to do and be aware of are:

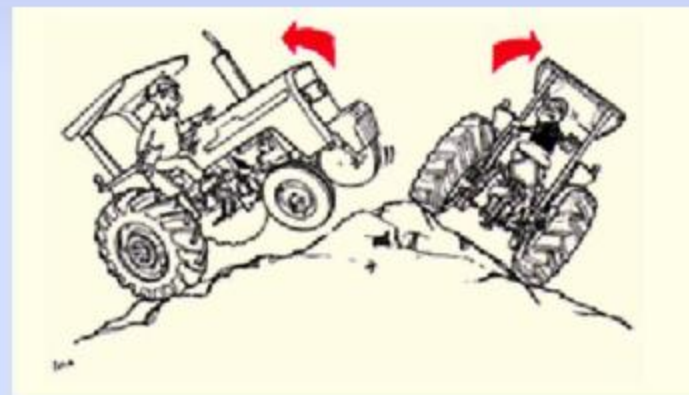
1. Read the owners manuals and follow all of the safety instructions
2. If you are working on equipment make sure it is off and can't move
3. If you remove a safety guard or shield, always replace it before using the equipment

Ten Commandments of Tractor Safety

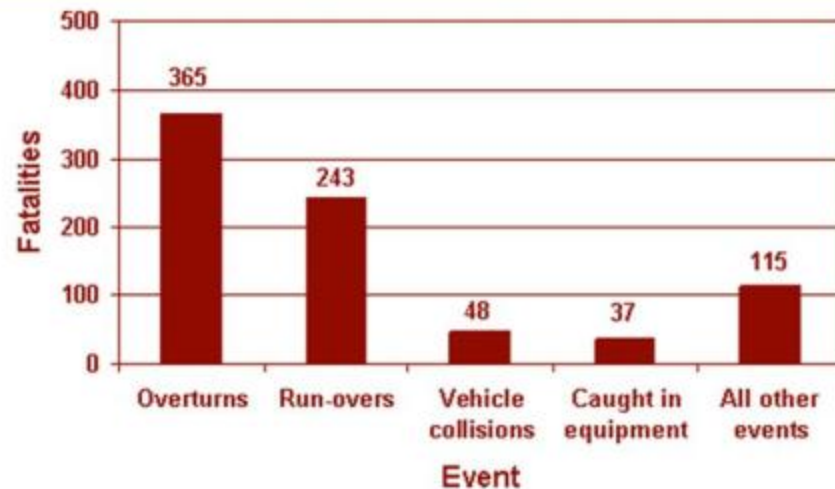
1. Know your tractor, its implements and how they work. Keep your tractor in good condition
2. Use ROPS and seat belt whenever and wherever applicable. We recommend the use of ROPS (Rollover protective structure) in almost all applications. Most tractor fatalities are caused by overturns. If the tractor is equipped with ROPS, always wear the seat belt
3. Be familiar with your terrain and drive safely. Use caution on slopes, slow down for all turns and stay off the highway whenever possible. Elementary, but all too often neglected
4. Never start an engine in a closed shed or garage. Carbon monoxide is colorless, odorless—and deadly
5. Always keep your PTO properly shielded. It rotates with the strength of 500 men
6. Keep your hitches low and always on the drawbar. Otherwise your tractor might flip over backwards
7. Never jump off a moving tractor or leave it with its engine running. A runaway tractor can be extremely dangerous
8. Never refuel while the engine is running or hot. And do not add water to radiator while the engine is hot; hot water can erupt and scald
9. Keep all children off of and away from your tractor and its implements at all times. A tractor's work is not child's play
10. Never be in a hurry about anything to do with your tractor. Take your time and do it right

Types of tractor injury-incidents

- ◆ By-pass starting
- ◆ Front-end loader incidents
- ◆ Rearward tractor rollovers
- ◆ Sideways tractor rollovers
- ◆ Falls from tractors (extra riders)
- ◆ Tractor runovers
- ◆ Caught-between crushing
- ◆ PTO stub shaft entanglement



Adult work related tractor fatalities in agriculture by event (2003-2007)



Tractor Rollovers

Rollovers account for about one-half of all tractor fatalities on our farms. The chief causes of these rollovers include:

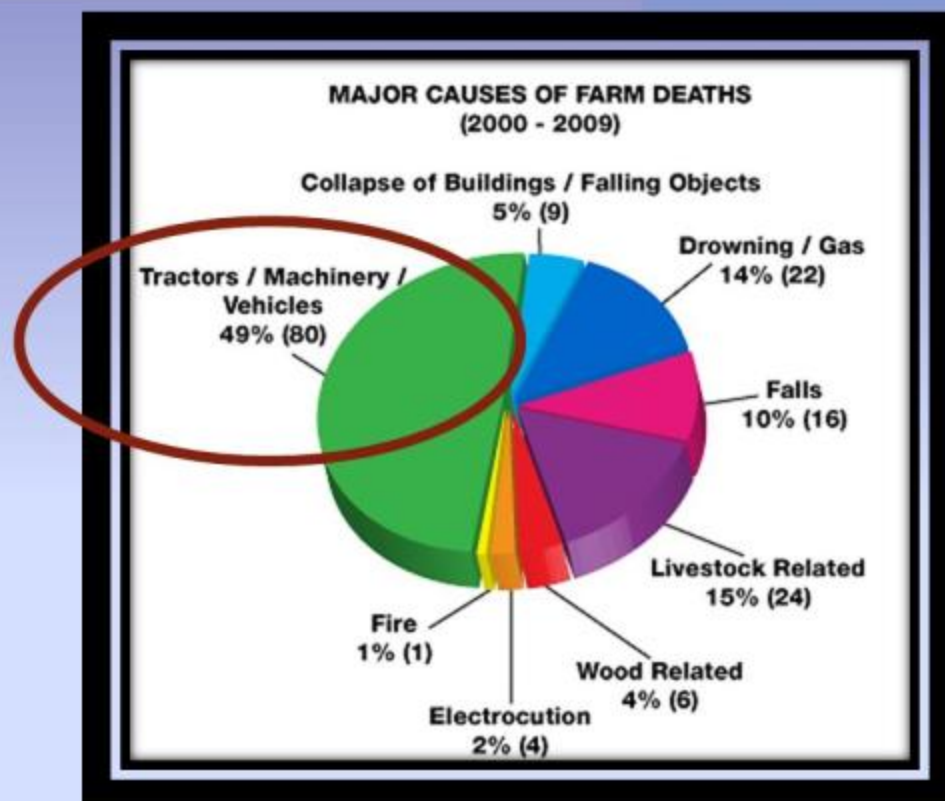
- Driving too fast for conditions
- Striking surface irregularities such as rocks, stumps and holes
- Short turns at high speeds
- Running into ditches
- Hitching high for extra traction
- Driving on steep slopes
- Improper operation of front-end loaders

<http://nasdonline.org>



Farm machinery and equipment

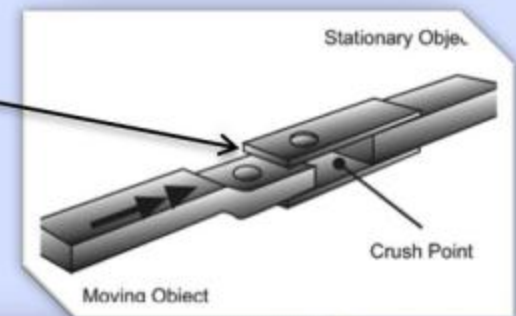
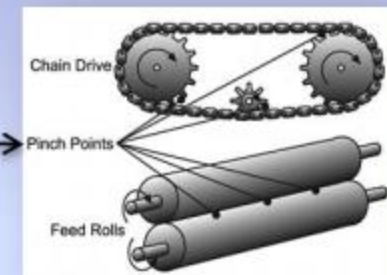




Machinery, Equipment
and Tractors are the most common
causes of farm deaths

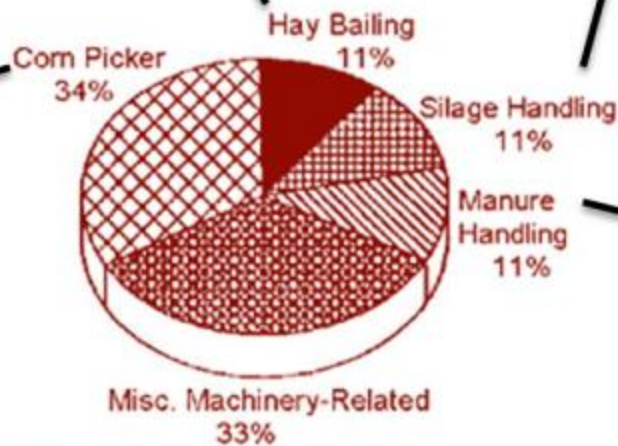
Machinery/Equipment

- When working on or around equipment be careful of the following:
 - Shear points – places where the edges of two moving parts come together
 - Pinch points – where two objects move together
 - Wrap points – are exposed rotating parts of machinery
 - Crush points – where two parts move together
 - Free-wheeling parts – parts that continue to move after the machinery is stopped
 - Pull-in points – places where you can be pulled into the machinery
 - Thrown objects – places where debris is thrown from the machinery





MACHINERY-RELATED FATALITIES 14% Total Farm Fatalities



(1990 National Safety Council Statistics)

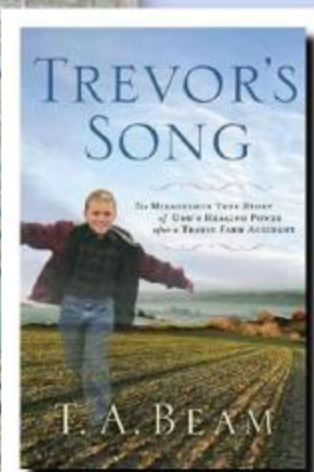




Trevor Beam was only 8 years old when he made one false step in a harvester wagon.

His bulky winter jacket was snagged in the machinery and he was pulled into spiked bars that could have killed him instantly. Instead he almost lost his legs (especially the right leg) and had to undergo lots of painful treatments

His story is told in the book "Trevor's song".



Machinery/Equipment/Tractors



- Hydraulic systems store a lot of energy so make sure that the pressure is released prior to working on them
 - Make sure that the pump is off
 - Lower all attached equipment to the ground
 - Double check the make sure the pressure is off prior to work
- Springs also store energy and can cause injury in not handled correctly
- Be careful entering and exiting equipment as dust or other substances can make platforms and ladders hazardous.



ATVs

- ATVs are very common on farms
- They also cause a large number of injuries
- Everyone using an ATV should wear a helmet
 - Helmets reduce risk of death by ~40%
- Children under 16 should not operate ATVs
- Use good judgment when operating an ATV.
 - No horses play
- If traveling on the road between fields make sure it is equipped with a slow moving vehicle sign



Tools



Common sense recommendations regarding the use of hand tools



- Read safety warnings
- Before using a tool make sure that it is safe to use
 - Is the handle broke?
 - Are all safety guards in place?
 - Is the electric cord in good repair?
- Use tools only for their proper function
 - Use the right tool for the job
 - Screwdrivers are not chisels
 - Wrenches are not hammers



Hand tools

- Use personal protective equipment

- Safety glasses
- Hearing protection
- Gloves
- Respiratory protection from dust



- Make sure young children can not access hand tools
(they are not toys, but may look like them)

OSHA recommendations for all power tools



- Never carry a tool by the cord or hose
- Never yank the cord or the hose to disconnect it from the receptacle
- Keep cords and hoses away from heat, oil, and sharp edges
- Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits and cutters
- All observers should be kept at a safe distance away from the work area
- Secure work with clamps or a vise, freeing both hands to operate the tool



OSHA recommends the following for all power tools



- Avoid accidental starting
 - Don't hold a finger on the switch button while carrying a plugged-in tool
- Tools should be maintained with care
 - Keep tools sharp and clean for best performance
 - Follow instructions in the user's manual for lubricating and changing accessories
- Be sure to keep good footing and maintain good balance
- The proper apparel should be worn
 - Loose clothing, ties, or jewelry can become caught in moving parts (That includes wedding rings)
 - Keep long hair pulled back
- All portable electric tools that are damaged shall be removed from use and tagged "Do Not Use"

Electrical tools

- These tools use electricity for power
- Improper use can lead to electrical shock or burns
- The following general practices are advised:
 - Electric tools should be operated within their design limitations
 - Gloves and safety footwear are recommended during use of electric tools
 - When not in use, tools should be stored in a dry place
 - Electric tools should not be used in damp or wet locations
 - Work areas should be well lighted



Abrasive tools

- These tools are used to grind, cut, polish, sand or buff
- Small particles often fly off making eye protection extremely important
- The following general practices are advised:
 - Always use eye protection
 - Turn off the power when not in use
 - Never clamp a hand-held grinder in a vise



Pneumatic tools



- Pneumatic tools use compressed air to operate and include; wrenches, hammers, drills, clippers, and sanders
- Always use pneumatic tools on a hard surface
- Use accessories that are designed for pneumatic tool use (wrenches, chisels, etc.)
- Nail guns are not toys and should never be pointed at another person

Face protection is very important with pneumatic tools



Powder-actuated tools



These tools are loaded like a gun with at powder charge

Usually only operated by trained personal

The following general practices are advised:

- These tools should not be used in an explosive or flammable atmosphere
- Before using the tool, inspect to determine that it is clean, that all moving parts operate freely, and that the barrel is free from obstructions
- Tools should never be pointed at anybody
- Tools should not be loaded unless it is to be used immediately
 - A loaded tool should not be left unattended



Powder-actuated tools

Hands should be kept clear of the barrel end.

- To prevent the tool from firing accidentally, two separate motions are required for firing: one to bring the tool into position, and another to pull the trigger
- Tools must not be able to operate until they are pressed against the work surface with a force of at least 5 pounds greater than the total weight of the tool



Jacks

- Never try and lift objects that are heavier than what the jack can safely lift
- Jacks should not be used to support a lifted load, use jack stands for that
- When using a jack make sure that:
 - The base rests on a firm level surface
 - The jack is correctly centered
 - The jack head bears against a level surface
 - The lift force is applied evenly
 - Never lift higher than is necessary



Axes



Axes



- Ax must be sharp and in top condition
 - If the head is loose, soak the ax for a few hours and that will make the wood to swell and the handle will be tight for a while
 - Fix or replace as soon as possible
- You must have plenty of room in which to swing an ax
 - Check your clearance above your head
- Wear sturdy leather boots to protect your feet



Rubber boots are no match for an ax

Axes



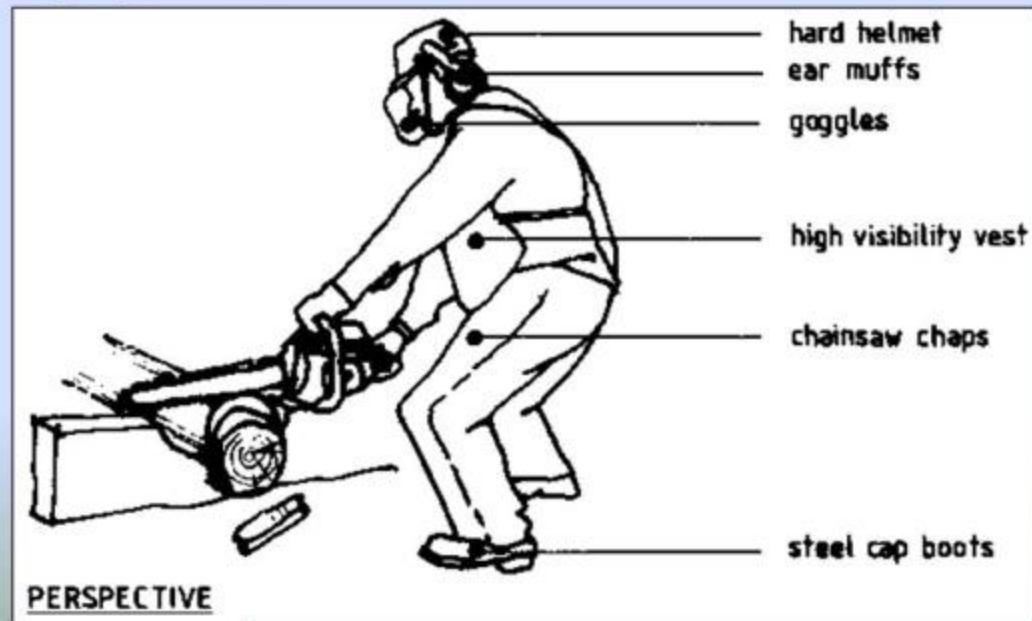
- Carry an ax at your side with one hand, the blade turned out from your body.
- Never carry an ax over your shoulder

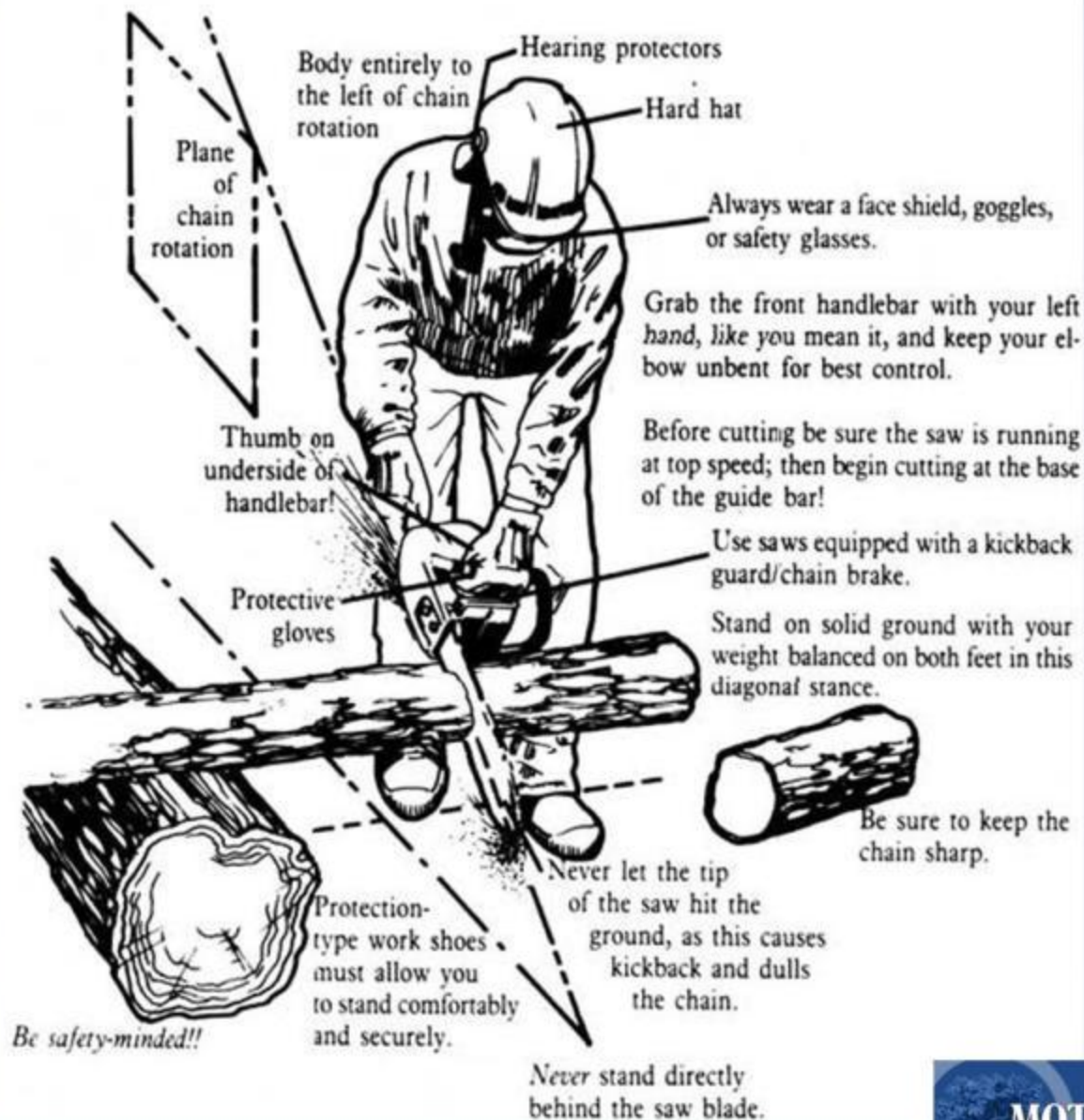


Chainsaws

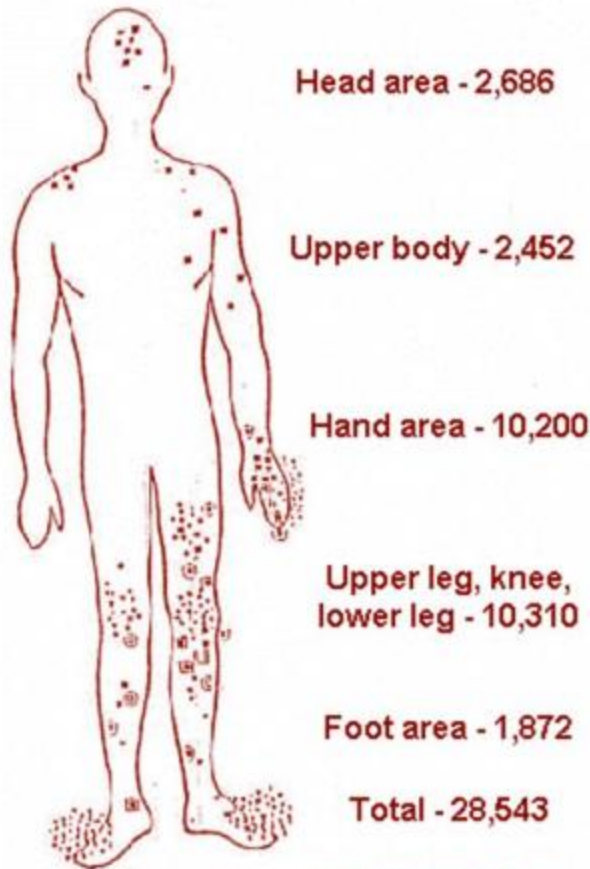


- Chainsaws are one of the most dangerous tools on the farm
- Know and understand the manual before you use the saw
- Use personal protective equipment
 - Safety goggles
 - Hearing protection
 - Hard hat
 - Gloves
 - Steel-toed shoes
 - Safety chaps
 - No loose fitting clothing





**Accident Location and Frequency
Related to Chain Saw Use in 1999**



Statistics supplied by the U.S. Consumer Product Safety Commission report on Chain Saw Related Accidents in 1999.
Source: NHTSA (National Electronic Injury Surveillance System)

Every year over 40,000 people are injured while using chain saws in the US.

Total medical costs for chainsaw injuries is around \$300, million dollars per year.

The average cost for a chainsaw injury is over \$7,500 a year



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The drastic effects of a kick-back

This young farm hand was lucky not to lose an eye after being cut by a chainsaw that had no chain brake



Chainsaws



- Before using the saw make sure it is ready to go:
 - Sharpen the teeth, sharp teeth cut better and are less likely to cause injury
 - Adjust the tension (see the manual for instructions)
 - Make sure it is full of fuel and oil
 - If saw is hot let it cool before adding fuel

Check for nails and other metal objects

Clear all debris and rocks from the path of the saw

Make sure that others stay away from where you are cutting

Maintain good footing and keep your hands on the handles while operating the saw



Chainsaws



When cutting trees and limbs:

- Prevent the trunk or limb from bending against the saw
- Look up!
 - Make sure that there are no dead limbs that can fall on you as you cut
 - Watch out for branches that are under tension as they may spring out when cut
 - Be cautious of kick-backs.
 - Avoid using the tip of the saw to cut

**When carrying the saw make sure the
brake is engaged or the saw is off**



Electricity



Electricity hazards around the farm



◆ Power lines

- ◆ Always look up when moving equipment or objects (particularly irrigation pipes)
- ◆ Be careful when working on elevated equipment, because power lines will be closer
- ◆ Always locate buried power lines before digging



Extension Cord Safety Tips For The Workplace

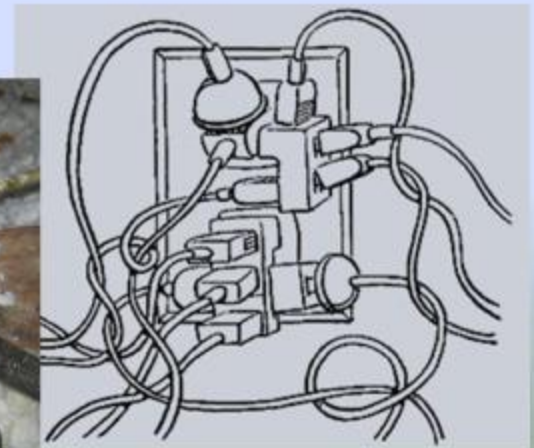


1. Always check the extension cord before each use. Make sure the cord is not frayed or broken in any way. Exposed wires can cause electrical fires.
2. Keep the cord out of walkways. If it is possible to keep it against a wall that is always the best option.
3. Taping the cord to the wall or floor will help keep it in place so that it does not become a tripping hazard.
4. When buying extension cords check to see if they have the UL stamp. This signifies that the cord has been tested by the Underwriters Laboratories. It shows that the cord has been approved by consumer safety.
5. Never use more than one extension cord at a time. If it is not long enough buy a new extension cord that is long enough to fit your needs.
6. Keep all cords away from areas where water is present.
7. Never use a cord that is marked for outdoor use in a building. They are marked that way for a reason.
8. If you must run a cord across a hallway or high traffic area make sure it can be seen by any person walking by.

Electricity hazards around the farm



- Extension cords that are missing insulation
- Overloaded outlets
- Drilling into a power line in a wall
- Shorts in power tools or electric lines
 - Rodent damage to electric lines can cause them to short out



Electricity

- ◆ Before working on equipment disconnect it from all sources of electricity
 - ◆ Never assume equipment it is not electrified
 - ◆ Know how to check for electricity and have the proper tools to safety work, if not call a professional!
 - ◆ Make sure electrical sources can be locked off for maintenance
 - ◆ Remember that some equipment store electricity so you can still be electrocuted even if the power supply is cut off



Electrical fences

- They can create a fire or electrocution hazard
- Lighting strikes may follow fence wires into building and start a fire or electrocute people or livestock
- Fences should be mounted at least ten feet from any structure or areas where combustible materials such as hay are stored
- Electric fence wire should not be run along buildings or storage areas
- Fences must be properly grounded and installed according to manufacturer instructions



Never touch a fence that may be electrified with two hands, as this will allow the current to travel through the heart and lungs.

Always keep one hand in your pocket so you don't accidentally touch something that will turn a painful but non-lethal shock into cardiac arrest



Lifting



Lifting

- Improper lifting is one of the most common causes of back injuries



Before lifting an object check to make sure you can:

- Carry the load to the destination?
- Check for objects in the way such as uneven surfaces, rocks, fence, ropes, stairs, curbs, extension cords
- Do you have to pass through a doorway? If so, is the door open, with the object you are carrying fit through the door?
- Once you have lifted the object will it block your view?
- Can you take the object apart and safely carry the pieces instead?

Lifting

- ◆ Test the load before carrying it by lifting a corner of the object
- ◆ If it is too heavy or an odd shape, then ask for help
- ◆ Do you need personal protection such as gloves?
 - ◆ Leather chaps help when loading small bales of hay
 - ◆ Always wear gloves with moving metal
- ◆ Can you use a mechanical lift?



Lifting

- ◆ To properly lift an object you should:

- ◆ Get as close to the object as you can
- ◆ Make sure your feet are firmly planted
- ◆ Bend at your knees and not your back
- ◆ Securely grasp the load
- ◆ Lift by straitening your knees
- ◆ Make sure that you do not twist your body while lifting

To set an object down just do the opposite of lifting



Lifting



- ◆ While carrying the load make sure that:
 - ◆ Walk slowly
 - ◆ Keep your back as straight as possible
 - ◆ Don't twist your body, change directions with your feet and legs
 - ◆ Try and avoid lifting objects over your head
 - ◆ And if you get tired, set the load down and rest before continuing

Most back injuries are irreversible!!

Be careful!!



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Want more information?



National Education Center for Agricultural Safety	www.necasag.org
Northeast Iowa Community College	www.nicc.edu
National Safety Council	www.nsc.org
Dubuque County Emergency Responder Training Facility	www.dubuquecountyfire.org
Progressive Ag Foundation	www.progressiveag.org
Agricultural Safety & Health Council of America (ASHCA)	www.ashca.org
National Institute for Farm Safety (NIFS)	www.nifsagsafety.org
AgriSafe	www.agrisafe.org
Farm Safety 4 Just Kids	www.fs4jk.org
Children's Ag Safety Network (CASN)	www.childagsafety.org
North American Guidelines for Children's Agricultural Tasks	www.nagcat.org
National Farm Medicine Center	www.marshfieldclinic.org/nfmc
National Children's Center for Rural & Agricultural Health & Safety	www.marshfieldclinic.org/nccrahs
Iowa Center for Agricultural Safety & Health (I-CASH)	www.public-health.uiowa.edu/ICASH
Great Plains Center for Agricultural Health	www.public-health.uiowa.edu/gpcah
National Institute for Occupational Safety & Health (NIOSH)	www.cdc.gov/NIOSH
National Ag Safety Database (NASD)	www.nasdonline.org
North American Agromedicine Consortium (NAAC)	www.agromedicine.org
American Society of Agricultural and Biological Engineers	www.asabe.org
Canadian Agricultural Safety Association (CASA)	www.casa-acsa.ca
Farm Safety Association – Canada (FSA)	www.farmsafety.ca
Farm and Ranch Safety & Health Association (FARSHA)	www.farsha.bc.ca
Iowa Fire Service Training Bureau	www.dps.state.ia.us/fm/fstb