



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

This program is funded by the
**Beginning Farmer and Rancher
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USDA-NIFA-BFRDP 2010-03143



Farm Safety



This project is partly sponsored by
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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

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:

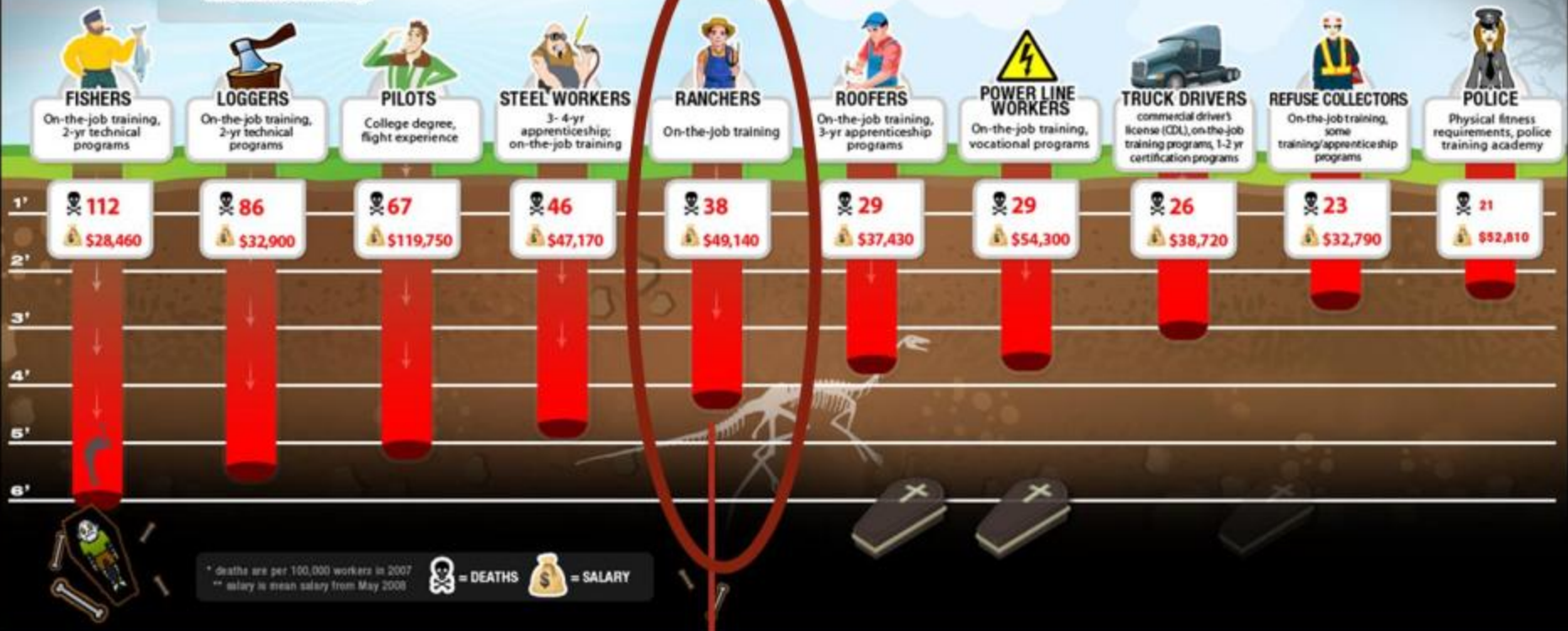


The 10 Deadliest Jobs in the US

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.



* deaths are per 100,000 workers in 2007
** salary is mean salary from May 2006

☠ = DEATHS 💰 = 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/>

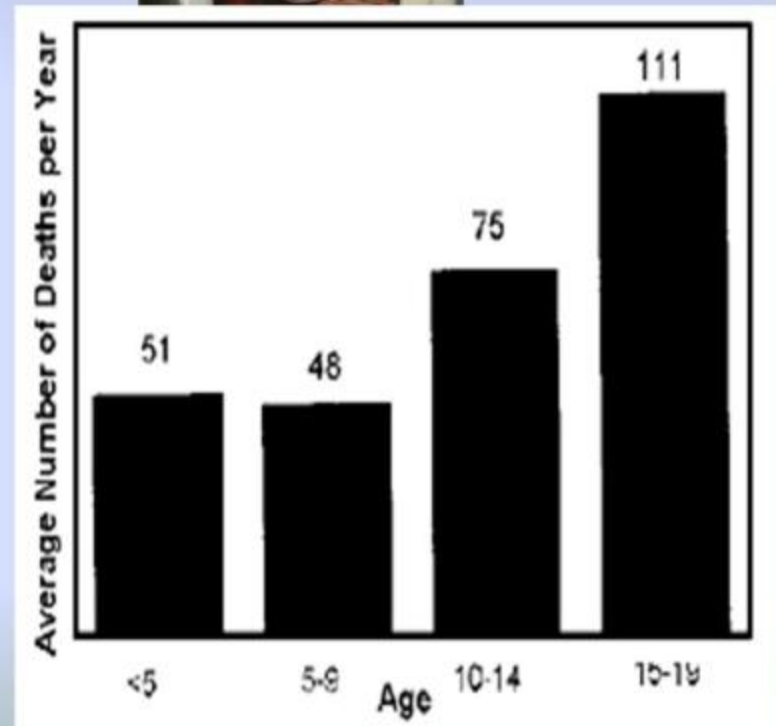
Alphabetical listing of recognized Safety and Physical hazards, Biological and Chemical Hazards and Diseases pertaining to agriculture

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

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

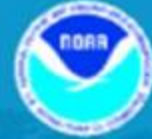


Farm Safety

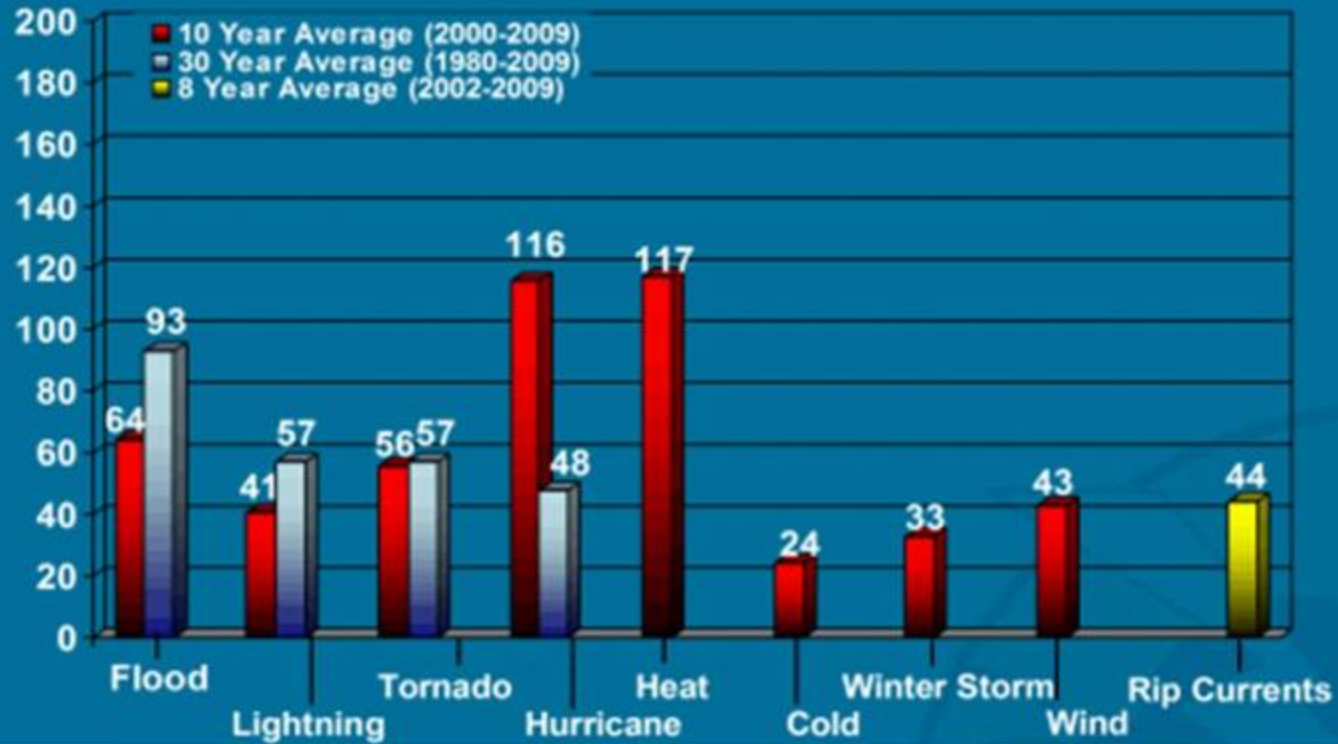


- **Always Call 911 if there is an emergency**
- Owner/operators should take at a minimum a first aid course, which includes CPR





Weather Fatalities



Weather

Weather creates hazards for both people and livestock

- Heat
- Cold
- Rain
- Ice
- Wind
- Snow
- Hail
- Lightning



Heat-related illnesses include:



- ◆ **Sun Burn**
 - ◆ swelling, blisters, fever and headache.
- ◆ **Heat Syncope**
 - ◆ dizziness or fainting
- ◆ **Heat Cramps**
 - ◆ Heavy sweating followed by painful muscle spasms in the legs, arms, or stomach
- ◆ **Heat Exhaustion**
 - ◆ headache, nausea, clammy moist skin, pale complexion with a normal or slightly elevated body temperature
- ◆ **Heat Rash**
 - ◆ caused when clothes remain damp in hot humid conditions.



Losing your cool

The body cools itself by evaporating sweat on the skin. But prolonged heat can cause a breakdown in this physiological mechanism, leading to heat exhaustion, and the most severe form of heat illness, heat stroke.

	Heat exhaustion	Heat stroke
WHAT IS IT?	The body runs out of water and salt.	Sweating mechanism breaks down, overheating the body.
SYMPTOMS	Face pale; headache; nausea; skin is cool and clammy; sweating profusely	Face flushed, headache, nausea, skin hot and dry, no sweating, body temperature 105°F or higher
IF NOT TREATED	Collapse, heat stroke	Confusion, shock, coma, death
IMMEDIATE AID	Cool shade; drink water with two teaspoons of salt per liter	Cool victim down; place in shade; wrap in cool, wet sheet; call for medical assistance

PRECAUTIONS

■ Stay indoors

Spend as much time indoors as possible on very hot days.

■ Outdoor activities

Schedule vigorous activities and sports for cooler times of the day.

■ Drink water

Drink a lot of water, get enough salt especially during outdoor activities.

■ Sun protection

Stay in the shade, protect yourself from the sun with lightweight clothing.

Sources: World Book Medical Encyclopedia, Associated Press

Chronicle Graphic



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Heat exhaustion and heat stroke



Heat emergencies are of three types: heat cramps (caused by loss of salt), heat exhaustion (caused by dehydration) and heat stroke (shock). Remove the victim from the heat and have him lie down. Apply cool compresses, elevate the feet, drink fluids and use a fan to blow cool air. Get medical help if needed.

Every year many farm workers are treated in hospitals for heat stroke and heat exhaustion

Prevent heat related injuries by:

- Avoiding hard work during the hottest part of the day
- Wear light loose-fitting clothing that is light in color
- Wear a wide brim hat
- Drink lots of fluids periodically, don't drink alcohol
- Take frequent breaks in cool and shaded areas
- Work at a slower pace
- Get acclimatized to the weather prior to working
- Learn how to recognize the signs of heat exhaustion and stroke

Most common problems of cold weather in the farm

Hypothermia
Frostbite
Chilblains
Dehydration
Sunburn
Snow blindness

HYPOTHERMIA FIRST AID

ALL CASES

- Move victim to dry shelter and warmth
- Handle gently
- Remove wet clothes — cut off if necessary
- Apply mild heat (comfortable to your skin) to head, neck, chest and groin — use hot water bottles, warm moist towels
- Cover with blankets or sleeping bag; insulate from cold — including head and neck

MILD CASES

- Primary task is to prevent further heat loss and allow body to rewarm itself
- Give warm, sweet drinks — *no alcohol*
- Apply mild heat source to stabilize temperature and/or
- Exercise to generate heat
- Hot shower to point of perspiring
- Keep victim warm for several hours

MODERATE CASES

- Same as above
- Offer sips of warm liquids only if victim is fully conscious and able to swallow without difficulty — *no alcohol*
- Have victim checked by doctor

SEVERE CASES

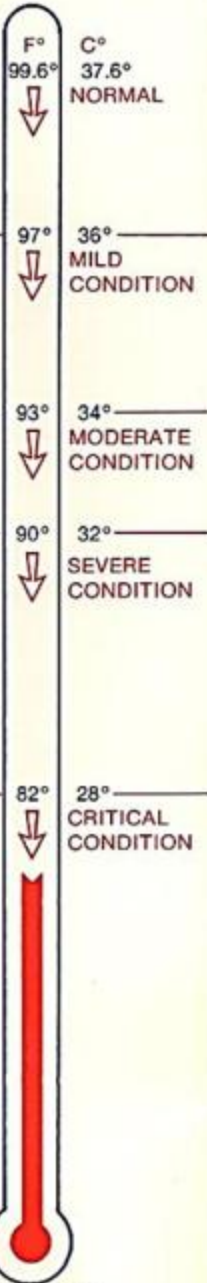
- Obtain medical advice as soon as possible using your radio
- Assist victim, but avoid jarring him — rough handling may cause cardiac arrest or ventricular fibrillation of heart
- No food or drink
- Observe for vomiting and be prepared to clear airway
- Ignore pleas of "Leave me alone, I'm O.K." Victim is in serious trouble — keep continuous watch over victim
- Lay victim down in bunk, wedge in place, elevate feet, keep immobile; no exercise
- Apply external mild heat to head, neck, chest and groin — keep temperature from dropping, but avoid too rapid a temperature rise.
- Transport soon, gently, to hospital

CRITICAL CASES

- Always assume patient is revivable — don't give up — pulse very difficult to feel
- Handle with extreme care
- Tilt the head back to open the airway — look, listen and feel for breathing and pulse for one to two full minutes
- If there is any breathing or pulse, no matter how faint or slow, do not give CPR, but keep a close watch on vital sign changes
- Stabilize temperature with available heat sources, such as naked chest-to-back warming by other crew member (leave legs alone)
- If no breathing or no pulse for one to two full minutes, begin CPR immediately
- Medical help imperative — hospitalization needed

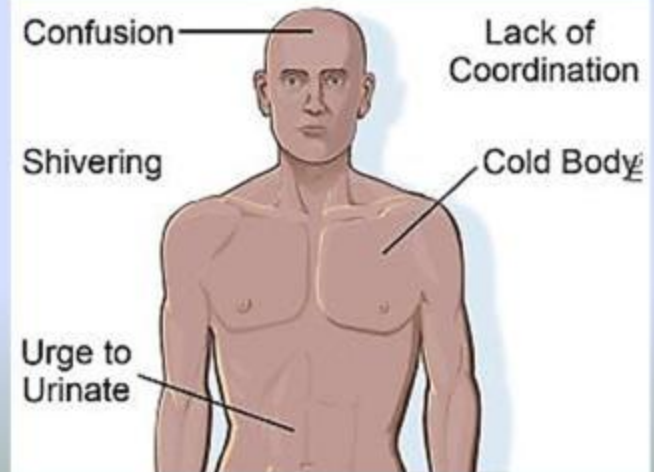
WARNING

- First aid for severe and critical hypothermia is to add heat to stabilize temperature only. Rapid rewarming, such as a hot shower or bath, may be fatal; it will, at least, cause complications. Allow body to rewarm itself slowly.
- Body core temperature lags behind skin temperature during rewarming. Keep victim protected for extended period after apparent full recovery or medical help arrives. Many hours are required for return to normal temperature.
- Always assume hypothermia is present in all man-overboard situations in which the victim has been exposed for more than 10-15 minutes.
- Victims may also be suffering from near drowning, thus needing oxygen. Observe for vomiting.
- In a helicopter rescue, protect victim — including the head — from rotor blast wind chill.



Body temperature
(taken rectally)

Hypothermia





Rain

- ◆ Rain can cause flooding of roads and fields
- ◆ If flooding occurs livestock needs to be able to get to higher ground or they will drown
- ◆ Flooding can also ruin equipment that is left on low lying areas
- ◆ Every year hundreds of people die trying to drive through flooded roads. Don't drown, turn around!
- ◆ Rain can also cause electrical problems if roofs leak
- ◆ Electrical fences are also an important risk
- ◆ Even if roads are not flooded they will be slippery and visibility will be lower. Hydroplaning is also a concern

Flood



Pile of dead cows after a flood in
Seattle, 2007



HAIL

Getting caught out in a hail storm with no protection can be painful and deadly

Large hail has been known to kill livestock and destroy gardens and field crops

Hail can also damage buildings, vehicles and equipment



Hail damaged tomatoes



ICE

- ◆ It increases the chance of fall related injuries
- ◆ Makes driving and all jobs more dangerous
- ◆ Ice can also build up on trees and cause them or their branches to fall



ICE

Ice can form over water sources for livestock preventing them from drinking

Ice on ponds can be a danger as kids love to play on frozen ponds and if it is not thick enough they may fall through and drown



Snow

- Similar to ice, snow makes driving and walking much more difficult
- Snow can also build up on building and cause roofs to collapse
- Snow can make it hard for animals to access feed and water
- Snow also increases the number of falling accidents



Wind

Wind can cause damage to buildings, topple trees, cause branches to fall and damage buildings



- ◆ In rural areas wind storms often result in power outages
- ◆ Watch out for downed power lines
 - ◆ They may still be electrified and can kill if touched
- ◆ In strong winds flying debris can cause injury or death to both people and livestock

Tornado



Lightning



- Lightning strikes the Earth's surface about 100 times every single second

About 2,000 people are killed worldwide by lightning each year

- Many more survive strikes but suffer from lasting symptoms such as, memory loss, dizziness, weakness, numbness, and other life-altering ailments

Remember when it comes to lightning there is NO SAFE place outdoors



Dead cows lined along a metallic fence. Lighting struck the fence, and the current traveled along the fence killing the cows

(Ruth Lyon-Bateman)



Dead cows after a bolt of lightning hit the tree where they were huddled under to get out of a rainstorm

A reminder why you should never seek shelter under a tree during a thunderstorm

http://www.srh.noaa.gov/jetstream/lightning/lightning_safety.htm



LIGHTNING KILLS

Play It Safe !



Lightning Facts...

- ✓ No place outside is safe during a thunderstorm.
- ✓ Lightning kills more people annually than tornadoes or hurricanes.
- ✓ If you hear thunder, you're likely within striking distance of the storm.

Outdoors...

- ✓ Plan outdoor activities to avoid thunderstorms.
- ✓ Monitor weather conditions. If you hear thunder, get inside a substantial building immediately.
- ✓ If a substantial building is not available, get inside a hard-topped metal vehicle.
- ✓ Avoid open areas and stay away from isolated tall objects.

National Lightning
Safety Institute

Indoors...

- ✓ Avoid contact with any equipment connected to electrical power, such as computers or appliances.
- ✓ Avoid contact with water or plumbing.
- ✓ Stay off corded phones.
- ✓ Stay away from windows and doors.
- ✓ Remain inside for 30 minutes after the last rumble of thunder is heard.

If Someone Is Struck...

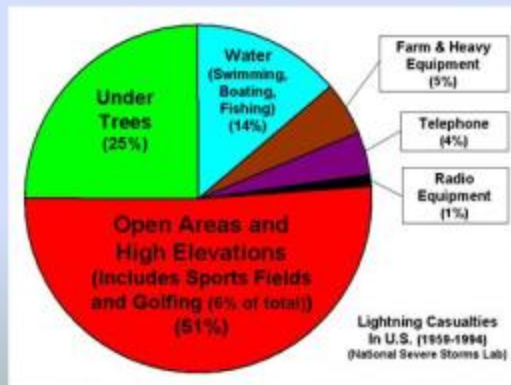
- ✓ Victims do not carry an electrical charge and may need immediate medical attention.
- ✓ Call 911 for help.
- ✓ Monitor the victim and begin CPR or AED, if necessary.

For more information, visit:
www.lightningsafety.noaa.gov

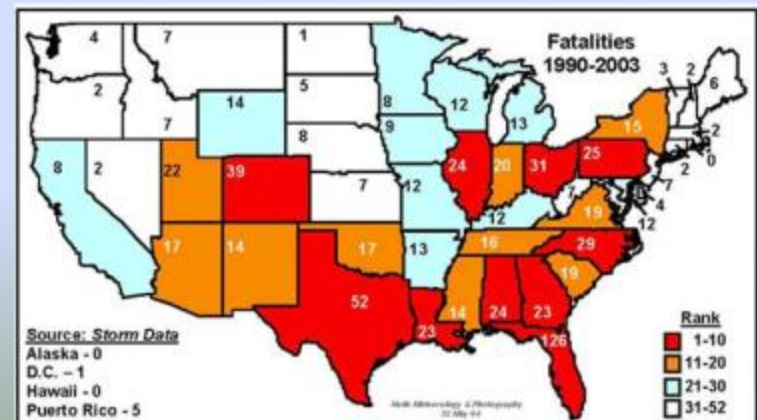


Lightning

- ◆ When lightning is in the area the National Weather Service suggests:
 - ◆ Get to a safe building
 - ◆ Safe buildings are enclosed with wiring and plumbing that will ground any lightning strikes
 - ◆ Get to a safe vehicle
 - ◆ Safe vehicles are fully enclosed with metal tops. Convertibles, golf carts, open cab tractors, and boats without cabins are unsafe
 - ◆ Wait 30 minutes after the last lightning to return outdoors



Lightning casualties in US
(1959-1994)





**Lightning can strike up to 25 miles away from
a thunderstorm cloud**



Fire

Farm fire prevention and safety



- A fire in your farm can rapidly put your life at danger, but also the lives of your family members, employees and animals
- Your farm buildings, equipment and livelihood can be wiped out in minutes

Safe fire prevention strategies can make a great difference



Farm fire prevention and safety



Fire prevention should be considered at all times

- When constructing any structure for the farm, try to use noncombustible and fire retardant materials
 - Cut and clear all grasses, weeds and brush from around buildings
 - Motors and all equipment should be kept free of dust and grease
-
- Inspect all wiring and electric motors and appliances for exposed wires, broken insulation, improper grounding and improper installation
 - Check gas and fuel oil systems for leaks and unsafe installations



Farm fire prevention and safety



- Prevent fires by keeping all ignition sources away from all combustible materials
- Keep work areas clean, dry and unobstructed
- If you have animals, check for excessive accumulation of dust, cobwebs, roofs and rafters

Rodents can gnaw on electrical wires and cause a fire

This is just one more reason why rodents and other pests must be kept under control in all buildings and areas of the farm



Farm fire prevention and safety



- Inspections and fire drills should be part of your normal farm activities
 - Test your fire or smoke system at least once a year
- Read the instructions on the extinguishers on your property. You should practice using an extinguisher before you ever need one
 - When the pressure in an extinguisher is going low, you can use that one to practice, so that you will be prepared when you need to use one in a real fire

Some fire departments host safety days when they will show you how to operate the fire extinguishers

All your family members and employees should be trained in fire prevention and safety



Farm fire prevention and safety



- Get adequate fire insurance coverage for your animals, buildings, equipment
- Invite your local fire department to your farm, ask for their expert opinion to make your farm more fire-safe and fire-proof

A quick inspection of your buildings can help you identify dangerous spots

The fire department can also help with the inspection of your fire extinguishers and teach you how to maintain and inspect them



Farm fire prevention and safety



- NO SMOKING inside any buildings or areas where flammable and combustible materials are stored
- NO SMOKING near storage, shipping or receiving areas where boxes and containers can easily catch on fire
- NO SMOKING near areas where gasoline is stored or used
- NO SMOKING near animals, storage areas, manure pits as several gases can be flammable

Plus, smoking is bad for you
and everybody around you!!



Farm fire prevention and safety



- **Fire extinguishers**
 - Select and provide fire extinguishers
 - Always make sure that each area has an extinguisher that matches the kind of fire that could develop in that area
 - Using the wrong type of extinguisher on a fast moving fire can cause the fire to spread faster
 - Read the extinguisher instructions to learn how to use the extinguisher before a fire ever starts

Farm fire prevention and safety



Follow the "PASS" acronym and you will easily figure it out

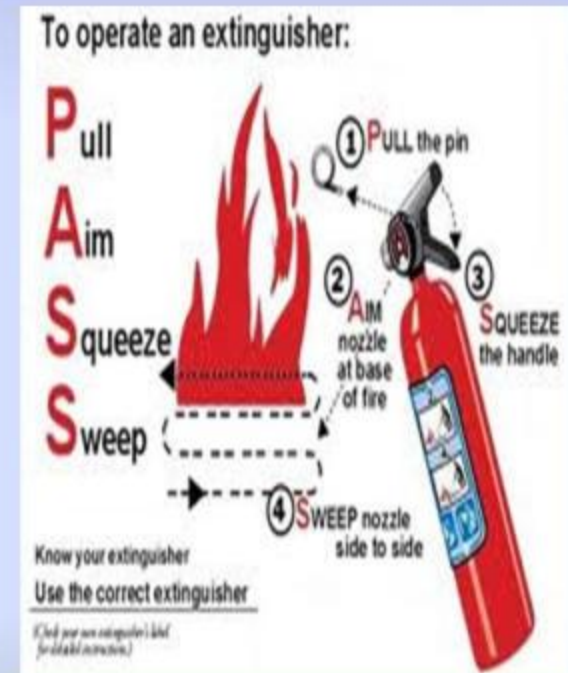
PASS

Pull the Pin at the top of the extinguisher. The pin releases a locking mechanism and will allow you to discharge the extinguisher

Aim at the base of the fire, not the flames. This is important – in order to put out the fire, you must extinguish the fuel

Squeeze the lever slowly. This will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop

Sweep from side to side. Using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out. Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on your fire extinguisher – different fire extinguishers recommend operating them from different distances. Remember: Aim at the base of the fire, not at the flames!!!!



Farm fire prevention and safety



Types of fire extinguishers

Fire extinguishers are divided into 5 categories based on different types of fires

A		Common Combustibles	Wood, paper, cloth etc.
B		Flammable liquids and gases	Gasoline, propane and solvents
C		Live electrical equipment	Computers, fax machines <small>(see note!)</small>
D		Combustible metals	Magnesium, lithium, titanium
K		Cooking media	Cooking oils and fats





Each fire extinguisher also has a numerical rating that serves as guide for the amount of fire the extinguisher can handle

The higher the number, the more fighting power

Always keep at least a 5 lb. extinguisher (a 10 lb. is better!)

Farm fire prevention and safety



Extinguisher		Type of Fire				
Colour	Type	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats
	Water	✓ Yes	✗ No	✗ No	✗ No	✗ No
	Foam	✓ Yes	✓ Yes	✗ No	✗ No	✓ Yes
	Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No
	Carbon Dioxide (CO2)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes

Fire extinguishers

Did you know that a big water/foam extinguisher last about 1 minute (more or less)?

A CO₂ extinguisher usually lasts 10-20 seconds!

Don't squeeze the lever until you are ready to aim at the base of the fire!



A fire extinguisher must be at all exterior doorways of all buildings in the farm and next to the electrical panel box

Fire extinguishers



Depending on how careful you've been, a fire extinguisher can last for 7-12 years

- But there are several common problems that many fire extinguishers face that can damage them
 - The seal around the fire extinguisher can weaken or break down, allowing the compressed air to escape
 - The container can rust and weaken or break down (allowing compressed air to escape)
 - Hoses may crack or break
 - Safety pin may get lost or unsealed
 - The handle can break or come loose



Fire extinguishers

- If your fire extinguisher has any of these problems, it is time to replace it!
 - Call the fire department in your area for instructions on how to recharge or dispose of a fire extinguisher
 - Corroded fire extinguishers can easily explode, call the fire department before trying to move it yourself
 - Never throw away a fire extinguisher in the trash. Because it is filled with chemicals and kept under pressure it can explode or become flammable



Farm fire prevention and safety



- When a fire has been burning for several MINUTES, the heat starts to build up and intensify
- Once that happens, you are past the point of the use of extinguishers and trying to control it yourself

**Get out of the building and
call the fire department**



This presentation was prepared by:



Dale Bumpers College of Agricultural, Food and Life Sciences and the
Division of Agriculture; University of Arkansas, Fayetteville

Dan Donoghue
Ixchel Reyes Herrera



USDA-ARS-Poultry Production and Product Safety Research Unit

Annie Donoghue
Jonathan Moyle

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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