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SOLUTIONS FOR **LIVING**

Personal Protective Equipment for Agriculture

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 UNIVERSITY
OF WYOMING
EXTENSION

Solutions for Living:

Personal Protective Equipment for Agriculture

The Occupational Safety and Health Administration (OSHA) estimates that, every day, 243 agricultural workers suffer a serious lost-work time injury. Five percent of these injuries result in permanent impairment. In 2010, the injury rate for agricultural workers was 20 percent higher than the rate for all workers. This is a conservative estimate as countless other accidents are never reported and many accidents occur to family members that are also under-reported. Many farm and ranch injuries could be prevented or their impacts reduced if farmers and ranchers wore proper personal protective equipment (PPE).

PPE refers to any specialized equipment or clothing worn by farmers and ranchers for protection against health and safety hazards. PPE is designed to protect many parts of the body; eyes, head, face, hands, feet, ears, or torso. PPE does not prevent accidents, but it does prevent or reduce injury and even fatalities when used.

Purpose of this document

Equipment and clothing is shown that can help farmers and ranchers remain safe when working around the many hazards on farms and ranches. The document is arranged into the following categories:

- Eye and face
- Hearing
- Respiratory (lung)
- Hand
- Head
- Foot
- Clothing

This document will not cover the selection, fit, use, cleaning, or storage of PPE. Readers are urged to view these sites for details on safety use of the equipment:

- Occupational Safety and Health Administration (OSHA)
www.osha.gov/Publications/osha3151.html
- National Institute for Occupational Safety and Health (NIOSH)
www.cdc.gov/niosh/topics/safety.html
- Purdue Pesticide Programs
www.ppp.purdue.edu

Definitions of equipment protection

Eye and face protection - To provide protection during exposure to hazards like flying particles, metal or sparks, liquid chemicals, caustic liquids, light radiation, i.e., welding, lasers.

Hearing protection - To provide protection during exposure to high pitch and loud noise levels.

Respiratory protection - To provide protection from inhalation hazards such as vapors, mists, particulates, pesticides, and gases.

Hand protection - To provide protection during exposure to potential hazards such as sharp objects, abrasive surfaces, temperature extremes, and chemical contact.

Head protection - To provide protection to potential hazards such as falling objects, striking against low-hanging objects, electrical hazards, or chemical application.

Foot protection - To provide protection for situations with the potential of injuries such as falling or rolling objects, chemical or liquid exposures, piercing objects, and where feet are exposed to electrical hazards.

Clothing protection - To provide protection from potential hazards such as entanglement, skin cancer, bodily injury, and pesticide contamination.

If it isn't worn - it won't protect

PPE not only helps protect people but also improves productivity. Farmers and ranchers can benefit from using the appropriate protective equipment for themselves, family members, and workers when the job and its potential hazards call for it. Protective equipment must be carefully selected. Test fit the protective equipment to be sure of a proper and comfortable fit. If it isn't comfortable - it won't be worn; if it isn't worn - it won't protect.

Controlling a hazard at its source is the best way to protect workers. OSHA emphasizes the use of work site modification or work tasks as the best control to manage or eliminate hazards. When these controls are not feasible or do not provide sufficient protection, then PPE should be employed.

Assessing and controlling hazards

Assessing and controlling hazards is a careful look at what, in the operation, could cause harm to people...the operator, family members, workers, guests...so that one can decide whether enough precautions have been taken or should more be done. If the hazard cannot be eliminated; then protecting people is what matters. To do this, a risk assessment of the farm or ranch is helpful.

- Step 1: What are the hazards? A hazard is anything that might cause harm, such as working from ladders or working around electricity. The risk is the chance that someone could be harmed by these hazards.
 - » Spot hazards by walking around the workplace and watching how people work.
 - » Learn from experience. Think about past accidents to see if there are less obvious hazards.
 - » Ask people who work on the operation. They may have spotted something you have not noticed.

- Step 2: Who might be harmed and how? For each hazard, decide who is most vulnerable to be injured...employees, seasonal workers, family (especially children), the public. Think on how they might be injured.
- Step 3: Weigh the risks and decide on precautions. For each hazard you need to look at what is already being done; the controls that are in place; and the way work is organized.
- Step 4: Put the results into practice. A risk assessment is not an end in itself. It will not stop someone from being injured, or made ill, or dying. Make sure everyone who works on the farm or ranch understands the controls you have put into place.
- Step 5: Check that controls stay in place and review the assessment. No workplace remains the same. Eventually new equipment will be purchased or ways of working have changed that might bring in new hazards. Conduct a risk assessment on an annual basis.

A risk assessment is an important step in protecting people, and the business, as well as complying with applicable laws. It helps one focus on the risks that really matter...the ones that can cause real harm (Health and Safety Executive: <http://www.hse.gov.uk/aboutus/index.htm>).

Acknowledgement and caveat

In addition to the above sites, information contained in this document also comes from:

- Environmental Health and Safety, University of California, Irvine. www.ehs.uci.edu/programs/safety/ppeprogram.html
- University of Tennessee Institute of Agriculture, Safety Office. <http://safety.ag.utk.edu/PPE%20and%20respiratory/index.htm>

Due to the dynamic nature of the World Wide Web, Internet sources may sometimes be difficult to find. Addresses change and pages can disappear over time. If problems are found with any of the listed websites or solutions in the publication, please contact Wyoming AgrAbility. Contact information is on the back cover of this publication.

Solutions for eye and face protection

Did you know...eye injuries are the leading cause of blindness among farmers and ranchers?

Protective eyewear can prevent eye injuries in more than 90 percent of cases.

Eye protection should always be worn where there is potential for injury to the eyes or face from small particles, toxic chemicals, flying particles, large objects, thermal or radiation hazards, and lasers. According to the types and extent of hazards, different PPE should be worn. These must always remain clean and free of contaminants.



Sun protective sunglasses

Look for ultraviolet (UV)-protection on product labels. Choose sunglasses that block 99 to 100 percent of the sun's UV rays. Opt for larger lenses rather than smaller lenses — better yet, the wraparound variety to protect the sides.

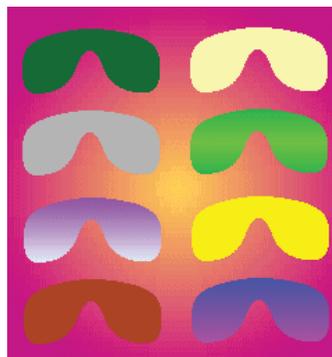
Safety glasses

Safety glasses should be impact resistant with wrap-around lenses for the most complete protection.



Goggles

Goggles offer good protection against front and side impact. Unvented or indirect vented chemical splash goggles provide protection from chemical vapors and liquids.



Absorptive lenses

A wide variety of absorptive lenses are available for use in safety glasses and goggles. Absorptive lenses offer additional protection for work where there is bright light or glare.



Full face shields (FFS)

FFS protect against splashing or dust but have varying degrees of impact resistance. Wear safety glasses or goggles underneath a face shield for complete protection.

Welding shields

Welding shields protect eyes from burns caused by infrared or intense radiant light during welding, brazing, soldering, and cutting. Safety glasses or goggles should be worn when using a welding shield.



Protective measures

Machine guards, eye wash stations, warning signs, proper lighting, work barriers, adequate ventilation.

For additional information on eye and face protection:
EHS Safety Training: Eye Protection (Oklahoma State University),
www.ehs.okstate.edu/modules/ppe/Eye.htm.

Solutions for hearing protection

Did you know...75 percent of all farmers and ranchers experience some form of hearing loss compared to 10 percent of the general public?

Thirty-three percent of all workers experiencing hazardous noise at work will develop noise-induced hearing loss.

Exposure to high levels of noise may result in hearing loss. PPE should be worn when the noise level is 85 decibels or greater averaged over an eight-hour period. Most hearing protection devices have a noise reduction rating (NRR) that indicates the amount of protection provided. In general, look for NRR of 25 or greater.



Formable earplugs

Useful for short wearing periods or infrequent use. Inexpensive and can be discarded when job is completed. Degree of protection is dependent on correct insertion; practice is needed. Not effective if hearing protection is required on a regular basis.



Pre-molded earplugs

Available in a variety of sizes. Often come with attached cord that makes them reusable if cleaned. Disadvantage same as with the formable earplugs.



Banded ear plugs

Hang around neck when not needed and can be quickly inserted. Most have replacement tips; no need to replace whole band.



Earmuffs

More comfortable to wear and offers better long term protection to loud noise than earplugs. However, noise reduction is not superior to properly inserted earplugs.



Electronic earmuffs

Offers the same protection as regular earmuffs with the addition of a variety of amplification options (including AM/FM radios) but at an added cost.



Cap mount earmuffs

Attaches to slotted safety helmet and, with the addition of a safety shield, allows simultaneous head, face, and hearing protection.

For additional information on hearing protection:

Safe Farm: Lend an Ear to Hearing Protection (Iowa State University Extension),
<http://www.extension.iastate.edu/Publications/PM1518J.pdf>

Solutions for respiratory protection

Did you know...agricultural workers encounter a variety of respiratory situations ranging from temporary discomfort caused by allergic reaction to fatal asphyxiation?

The risk of contracting severe lung disease or death can be significantly decreased by using respiratory protection.

Respirators are used to prevent the exposure to air contaminated with harmful dusts, fumes, mists, gases, smokes, sprays, or vapors. All respirator usage, including disposable respirators, air purifying respirators, and air-supplied respirators, require annual fit testing and training prior to use.



Air purifying disposable particulate masks with exhalation valve

Offers protection against non-toxic solid and liquid aerosols (e.g., oil mists). Exhalation valve makes breathing easier and reduces hot air build up. Product must be discarded when clogged.



Chemical cartridge respirators

Provide a higher level of protection than dust masks. Covers nose and mouth with valve to control air movement. Replaceable activated carbon cartridges filter incoming air. Requires fit test for proper fit and should not be used with facial hair.



Powered Air Purifying Respirators (PAPR)

Breathing from a battery-powered fan, which pulls air through filters and circulates air throughout full-faced respirator or hood. Requires fit test for proper fit.

Gas masks with cartridge

A full-face air purifying device with larger cartridge than chemical cartridge respirators that provides protection against pesticides and toxic airborne materials. They require sufficient levels of oxygen in the air to be filtered. Requires fit test for proper fit.



Self-contained breathing apparatus (SCBA)

Oxygen-providing respirators with air tank used in oxygen-deficient atmospheres. For use in silos, manure pits, grain storage areas, and during fumigation of structures. Requires fit test for proper fit.



For additional information on respiratory protection:

Respiratory Protection in Agriculture (Virginia Cooperative Extension)
http://pubs.ext.vt.edu/442/442-601/442-601_pdf.pdf

Solutions for hand protection

Did you know...hands are the body part most likely injured in agricultural settings accounting for approximately 22 percent of all work-related, non-fatal injuries to adults on U.S. farms and ranches?

Selecting proper gloves is very important since the hands are used to handle hazardous materials. In addition, traumatic injuries such as cuts, sprains, and punctures may occur. With the wide range of hazards, there are also a wide range of gloves that may be used as PPE. Chemical-resistant gloves are always recommended when working with pesticides and chemicals. Chemical-resistant aprons add protection from body absorption of hazardous chemicals.



Padded cloth gloves
Protects hands from sharp edges, slivers, dirt, and vibration. Not acceptable for handling hazardous materials.



Metal mesh gloves
Better protection than cloth gloves against sharp edges and cuts. Not acceptable for handling hazardous materials.



Rubber gloves
Offer protection when working around electricity.



Heat-resistant gloves
Offers protection from heat and flames.



Vinyl/neoprene gloves
Protects hands against toxic chemicals. Selecting the right glove is critical in handling the varying level of chemical toxicity. See link below for description of protective material used in gloves.



Nitrile protective gloves
Provides good protection when using many different pesticides.



Barrier laminate gloves
Offer the best chemical resistance in gloves designed to handle hazardous chemicals. Avoid cotton-lined or rubber gloves that absorb chemicals that result in continued absorption.

For additional information on hand protection:
Pesticide Safety: Choosing the Right Gloves (University of Nebraska-Lincoln)
<http://www.ianrpubs.unl.edu/pages/publicationD.jsp?publicationId=1209>

Solutions for head protection

Did you know...head protection designed to reduce the force of impact from falling objects can mean the difference between suffering a mild concussion or having permanent brain damage?

Head injuries are commonly caused by impact from falling or flying objects and walking into hard objects. PPE devices such as hard hats may protect one from objects contacting the head and, in a limited way, from electrical shock or burns.



Hard hats

(Class A)

Offers protection from falling objects and electrical shocks up to 2,200 volts.

(Class B)

Offers protection from falling objects and electrical shocks up to 20,000 volts.

(Class C)

Offers protection from falling objects but not from electrical shocks or corrosive substances.

Bump caps

Designed to protect bumping head on protruding objects. Normally does not have a suspension system inside the cap that acts as a shock absorber.



Chemical-resistant hats with added wide brim

Offers protection when applying pesticides but may not be compatible with certain types of respiratory PPE.

For additional information on head protection:
Head, Eye, and Foot Protection for Farm Workers (Penn State Extension)
<http://www.agsafety.psu.edu/factsheets/E39.pdf>

Solutions for foot protection

Did you know...“When your feet hurt, you hurt all over?” Proper footwear not only protects feet from injuries but also reduces the pain and fatigue that can lead to injuries.

Injuries that may occur when proper footwear is not worn are chemical and heat burns from spills of certain chemicals, compression injuries, electrical shocks, and slipping.



Steel toe footwear

Protects toes from falling objects and from being crushed.



Reinforced sole footwear
Offers added protection from punctures.



Latex/rubber footwear

Resists chemicals and provides extra traction on slippery surfaces.



Electrical hazard footwear

Insulated with tough rubber to prevent shocks and burns from electricity.



Nitrile footwear

Resists animal fats, oils, water, chemicals, and pesticides.

For additional information on foot protection:
Head, Eye, and Foot Protection for Farm Workers (Penn State Extension)
<http://www.agsafety.psu.edu/factsheets/E39.pdf>

Solutions for clothing protection

Did you know...fashion may not be foremost on the minds of farmers and ranchers, but proper clothing is an important component of personal protective equipment?

Protecting the body with the proper clothing can help prevent injuries or contamination, or lessen the impact of any that occur. Various farm and ranch jobs require different protective clothing.



Clothing structure

When selecting work clothes, wear nothing that has loose cords, is untucked, or tattered. These can get caught and possibly draw you into a machine.



Sun protective clothing

Closely woven fabrics are more protective against the sun's ultraviolet rays (UVR) because they lack open spaces to let UVR through to your skin. When in the sun, wear long-sleeve shirts, long pants, and socks.



Chaps for wood cutting

Select chaps with sewn-in ballistic nylon panels for extra protection.



Reflective safety clothing

If you are hunting, working in a field near where hunters are present, or working near traffic, wear bright-colored, highly-visible clothing.



Flame-resistant clothing

In the unlikely event of a flash fire, electric arc, metal splash or other catastrophe, flame-resistant work clothing reduces burn injury, provides escape time, and increases chances of survival.



Chemical-resistant coveralls and aprons

Coveralls and aprons (single-use or reusable) worn over regular work clothing offer additional protection when diluting, mixing, or applying pesticides. Pesticide labels may require them for certain pesticides.

For additional information on clothing protection:
Safe Farm: Promoting Agricultural Health and Safety (Iowa State University)
<http://www.abe.iastate.edu/safety.htm>



WYOMING AgrAbility

Cultivating Accessible Agriculture

Wyoming AgrAbility provides education, networking and information, and assistance to ranchers, farmers, agricultural workers and their families focused on promoting independence for those with disability resulting from injury, illness, aging, or other causes.

Authorized by the 1990 Farm Bill, the U.S. Department of Agriculture initiated funding for state-level programs to provide help on accommodating disability in agriculture. Twenty-two states are operating through this funding and make up the national effort known as the National AgrAbility Project.

As one of those states, Wyoming has created a partnership of the University of Wyoming through UW Extension, Wyoming Institute for Disabilities, and non-profit disability service providers Wyoming Independent Living Rehabilitation and Wyoming Services for Independent Living. This partnership offers comprehensive assistance to individuals and their families. Building on the strength of nationwide informational resources, along with a statewide network of agricultural, rural health, safety, and social agencies, Wyoming AgrAbility offers individual services for increasing self-sufficiency and independence.

For more information about Wyoming AgrAbility or to request an on-site ranch or farm assessment,

call (866) 395-4986 or
email AgrAbility@uwyo.edu
www.uwyo.edu/agrability

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