



RESPIRATORY HAZARDS ON THE FARM

Farmers breathe many potentially harmful dusts, gases and chemicals that affect everything from nasal linings to the lungs. The damage inflicted varies from watering eyes to the inhalation of deadly gases. Some respiratory diseases are acute, (short term) while others are chronic (on-going).

Respiratory Hazards on the Farm

A. Respiratory Hazards

These potential dangers can be found in

- Fields
- Manure pits
- Silos
- Pesticides

Examples of respiratory hazards

- Particulate contaminants
 - ✓ Dusts from grains
 - ✓ Silage
 - ✓ Feed

Some dusts can be seen with the naked eye while others cannot.

Toxic gases and vapors

- Silos where nitrogen oxides can build up
- Pesticides
- Paint

Oxygen-deficient atmospheres

- Sealed silos
- Manure pits
- Confinement buildings

B. Farmer's Lung

Allergic reaction caused by inhaling dust from moldy hay, straw and grain

Fine dust particles or mold spores, which grow in baled hay, stored grain or silage, accumulate in lungs. Eventually the mold spores attach to dusts and can pass easily through the nose and throat

Accumulation of the particles in the lung can cause symptoms similar to that of a cold or pneumonia

Repeated exposure causes increasing damage. Eventually causing shortness of breath and possibly permanent lung damage may result

Symptoms

- Begin 4-12 hours after exposure
- Cough
- Chills
- Labored breathing, or muscle pain



- Affects 5-8% of those exposed
- A person usually feels better in 3-5 days

Prevention

- Wear a respirator
- Inhibit mold growth by storing only dried grain and hay at moisture content appropriate for the length of storage. If mold growth has occurred, wet down the top layer of silage before removing it.
- Handle dusty materials mechanically if it creates less dust or keeps you farther away from the dusts
- Use large bales instead of small ones

C. Organic Toxic Dust Syndrome (OTDS)

Similar to Farmer's Lung caused by very high concentrations of moldy hay, grain and silage

OTDS can cause flu-like symptoms including chills, fever, cough, shortness of breath and fatigue

Symptoms may disappear with no apparent lasting affect

Both OTDS and Farmer's lung are often dismissed as the flu and are left untreated until the symptoms become more severe and chronic.

Prevention methods are the same as those with Farmer's Lung

<Note: The difference between Farmer's Lung and OTDS is that Farmer's lung is an allergic reaction and affects 5-8% of those exposed where as with OTDS anyone is susceptible. OTDS onset is usually after more concentrated exposure to moldy silage.>

D. Silo Fillers Disease

Severe lung irritation

Caused by the inhalation of Nitric Oxides released by fermenting silage

- Extremely toxic and sometimes deadly
- Can cause permanent lung damage

Nitric oxide build up begins within 2 hours of filling a silo

Reaches a maximum in two to three days and continue at a decreasing rate for 7 to ten days.

(Note: The presence and concentration vary widely depending on the composition of the silage, soil conditions, plant growth, weather, etc.)

Symptoms

- Cough
- Burning in throat
- Fever
- Bronchitis
- Shortness of breath and respiratory distress

Prevention

- Understanding the hazards associated with newly filled silos
- Never enter a newly filled silo for at least three weeks!
- If imperative
 - ✓ The blower should run for 30 minutes prior to entering
 - ✓ Silo doors should be kept closed during and after filling to prevent nitrogen



from flowing down the chute

- ✓ The door between the silo room and barn should be kept closed
- ✓ Children and animals should be kept away from the silo and feed room while filling and for two weeks after.
- ✓ Blower should run at least a half hour before entering
- ✓ Maximize ventilation
- ✓ Purchase a detector tube that measures the level of nitric oxide

E. Manure Gas

Deadly gases generated from the decomposition of animal urine feces (The concentration of gases is dependent on the type of animal, how they are fed, how wastes are handled and how well the facility is managed.)

Dangerous gases are trapped within manure

Often released when manure is agitated

Symptoms

- Cough
- Phlegm build up
- Scratchy throat
- Runny nose
- Watering eyes
- Headaches
- Wheezing
- Shortness of breath

Prevention

- Remove all people before pit agitation
- Maximize ventilation
- Never enter a pit especially during or just after agitation

F. Chronic Bronchitis

Chronic cough

End result of a variety of exposures

Lasts or recurs over years

Symptoms

- Shortness of breath
- Reduced endurance
- Permanent lung disease

Personal Protective Equipment (PPE)/Respirators

Filters out substances or blocks gases that are harmful to lungs

Different respirators for different activities

Purchase one that is task specific

Educate yourself with the most up to date information



A. Respirators Consist of Three Components

Face piece/Head Harness “The Respirator”

Chemical Cartridge which removes the gas and vapor

Particulate Filter/Pre-filter which traps dusts, mists and fumes

B. Head/Head Harness

Choice depends on type and danger of contaminant

Need for eye, face, body protection

Need for supplemental air/oxygen

Presence of facial hair

C. Negative Pressure Respirators (Air flow depends on wearer’s breathing)

Half-mask particulate

- One time use
- Filters particles (dusts, mists, fumes)
- Made from material and to the head by two straps

Disposable Half-mask, dual cartridge

- Filter particles (dusts, mists, fumes)
- Contaminant specific
- Maintenance-free
- Lighter than conventional reusable dual-cartridge respirators

Half Mask Dual Cartridge (reusable)

- Protect against gases and vapors
- Have replaceable cartridges that adsorb gases
- Have contaminate specific cartridges

(Note: using the wrong cartridge can be dangerous!)

Full-face Dual Cartridge (reusable)

- Filters and cartridges can be changed to match contaminant
- Offers face and eye protection
- Necessary when using a substance that is damaging to the skin/eyes (e.g. anhydrous ammonia)

D. Positive Pressure Respirators

Powered air purifying respirators (Do not supply oxygen)

- Battery power fan or motor unit work to pull air through filters and circulates over the face
- Airflow creates a cooling effect in hot atmospheres
- Filters and cartridges can be changed to match contaminant
- Come with a rechargeable battery pack
 - ✓ Especially good for people with heart and lung problems
 - ✓ Better fit for people with beards or sideburns

E. Supplied Air Respirator

Air is supplied from a clean air source through an airline to an individual

Used in spraying pesticides or spray painting

Some can be used in Immediately Dangerous to Life and Health situations if designated IDLH and are equipped with an emergency escape bottle



Partners in Agricultural Health PowerPoint Summaries

- Self-contained breathing apparatus (SCBA)
 - ✓ Provides a supply of oxygen (similar to SCUBA gear)
 - ✓ Used in Immediately Dangerous to Life and Health situations

F. Fitting – Inappropriate fitting may allow contaminants to enter around the face piece

Should fit snugly

Follow manufacturers directions

Fit check for Disposable Filtering Face piece Respirators (Dust/Mist/Fume)

- Cup both hands over the front of the mask and inhale
- If the mask pulls toward your face and no air leaks are noticed then it is a proper fit.

Fit check for Half Mask and Full-Face Respirators

- Block the exhalation valve with the palm of your hand
- Gently exhale and hold for about 10 seconds
- Check to see if the face piece is bulging slightly
- If the face piece remains bulging and there are no air leaks between your face and face piece then it is working properly

G. Maintenance

Follow manufacturer's instructions

Disinfect following use

Know when to replace a cartridge especially when

- You smell or taste a substance
- You experience throat or respiratory irritation

Before reusing inspect

- Head bands (stretch or torn)
- Valves (aging or damaged)
- Face piece (cut, torn, stiff or melted)
- Filter/cartridge (cracked, damaged threads)

H. Particulate Filters

Trap dusts, mists and fumes

Contaminant specific (look for the one filter that protects you from the substance with which you are working)

NIOSH coding system for filters

- N = Not resistant to oil- based chemicals and pesticides
- R = Resistant to oil-based chemicals and pesticides for 8 hours
- P= Oil base chemical proof

Each are coded with efficiency levels of 100%, 99% or 95%

(A unit coded P99 would mean at least 99% efficient and is oil proof)

Can I reuse a filter?

- Yes, but change when it becomes soiled or difficult to breath
- Filters are not washable!

I. Chemical Cartridge

Removes gas and vapor

Can be used with particulate filters “pre-filters”



Are color coded to inform you of the specific gas/vapor it is designed to protect you against

- White protects against Acid Gas
- Black = organic vapors
- Green = Ammonia Gas
- Yellow = Acid Gas and organic vapors

<Note: Using the wrong cartridge can be extremely dangerous!!>

Can I reuse a chemical cartridge?

- Yes, but change when
 - ✓ You smell or taste a substance
 - ✓ You sense throat or respiratory irritation
 - ✓ The respirator manufacturer or pesticide label requires it.
- Chemical cartridges cannot be washed!
- Concentration of contaminants are high

How should I store my respirator and filter?

- Uncontaminated area
- Remove (reusable) cartridge before storing
- Store in a dry container or plastic bag
- Don't place anything on top of it

Where to buy one

- General stores
- Cooperatives
- Pharmacies
- Mail order

Conclusion

There are serious respiratory hazards found on farms. With proper equipment and good management practices these potentially deadly diseases can be avoided completely. Respirators provide a great safeguard against many of these hazards, but only if you wear one. Choosing the right respirator for the job is critical.