Heiman Holsteins
Workshop locations

Needs list for managing specific incidents

Grain Bin / Silo Rescue

Must Have	Nice to Have	Win the Lottery
Trained personnel	Trained Personnel	Lots of trained Personnel
Proper PPE	Propper PPE	Propper PPE
Atmospheric monitoring	4 gas meter	4 gas meter
Lock Out / Tag out system to control power	Same	Same
Full body Harnesses for entry team	Same	Same
Device to keep grain from patient	Coffer Dam	Coffer dam and auger
Patient sling / recovery device	Commercial Recovery harness device for patient	
Ropes / Rigging / Hardware	Same	Same
Ladders to access patient	Truck Company	Aerial Ladders x2
Hand tools for cutting bin	Power tools for cutting bin	Multiple cutting tools
Lighting	Portable lighting	Battery operated lighting
Radio system	Radio system	Dependable radio system
Good set of hand tools	Better set of hand tools	Electric portable hydraulics
A plan and practice	Same	Same
On scene fire engine	On scene fire engine	On scene fire engine

Tractor Rollover

Trained personnel	Trained Personnel	Lots of Trained Personnel
Propper PPE	Propper PPE	Propper PPE

Revised: 10.19.2021

Off road access	Vehicles to go off road	ATV / UTV
Hand jacks / hand tools	Hand Jacks / High lifts	Air bag systems
Cribbing	More cribbing	A lot more cribbing
Cargo straps for stabilization	Rescue Struts	Struts and straps
A plan and practice	Same	Same
On scene fire engine	On scene fire engine	On scene fire engine

Equipment Extrication

Must Have	Nice to Have	Win the Lottery
Trained Personnel	More Trained Personnel	Lots of Trained Personnel
Propper PPE	Propper PPE	Propper PPE
Access to the patient	Vehicles to go off road	AYV / UTV available
Good hand tools	Pneumatic tools	Hydraulic, Air and hand tools
Cribbing	More cribbing	Lots of cribbing
Hand tools for cutting	more hand tools	Battery operated cutting tools
On scene fire engine	On scene fire engine	on scene fire engine

- EMS response levels – Consider tiered responses where required.
- Air vs. Ground resources should be resourced ahead of time.
- All these situations can be better met by pre-planning your responses – NFMC's Farm MAPPER is the tool you need t o make your responses safer and for a safer environment for that farm family.

FARM FAMILIARIZATION WORKSHOP

The purpose of this workshop is to instruct personnel that have little or no familiarization with Farm Hazards as well as how to map these areas on Farm MAPPER (nfmcfarmmapper.com).

Therefore, the following areas will / should be highlighted for them:
The TOP 10 AREAS ARE:

1- Determine a meeting place where we can expect to find members of the family / employees in the event of an on-sight emergency (fire, severe weather event etc.) accountability of all is important.

2- Utility shut offs – these include and utility on site – Electricity either at a central location or where to isolate specific buildings. Natural gas or LP – Tanks, Gas meters where the utility comes into the building (LOCK OUT TAG OUT) is required when Fire shut off a utility.

3- Hazardous materials storage – Includes – Pesticides, Fertilizers, Fuel – Gasoline, Diesel, Oils, lubricants – Issues with run off and finding SDS / MSDS sheets (which are very hard to find usually). Use of the "Orange" DOT reference guide may be indicated if unfamiliar chemicals are encountered.

4- Water Supply – Since farm buildings are usually on the larger size and require greater flows– A recommendation of finding 2 locations is important – Identify if these are dry hydrant or municipal hydrants or draftable ponds, rivers, lakes. This is very much an FD function.

5- Manure Storage – Above ground below ground – The need to identify the gasses that are present in manure – H2S, CO2, Methane and low O2 levels all may be present. Ventilate – Ventilate - Ventilate these areas is crucial. Gas monitors are critical. May also discuss the use of high-pressure pumps and drag line injection systems.

6- Confined Spaces – There <u>are many</u> (silos, Bins, pits, vats) all present atmospheric monitoring / and or ventilation before and during entering and occupancy. Try and identify as many as you can. Many of these areas are entered by farm personnel for maintenance issues all the time.

7- Where are the high dollar areas to protect – Milking parlor, computer areas, equipment storage. Animal areas.

8- Are there any special hazards to this operation? Farm tours, other hazards present on a "normal farm". Crop mazes, Hayrides, Grain dryers, language barriers with employees etc. etc.

9- Fire Department staging areas – Landing zones for aircraft – Again an FD function to select these prior to an incident.

10. Anything else unique to an operation – On site sales -Dairy stores etc.

Tractor Rollover

1. Incident information
    a. What, where, when
    b. Preplan?
2. Resources
    a. Stabilizing equipment
        i. Cribbing
        ii. Struts
        iii. Ratchet straps
        iv. Cable/chain pullers
        v. Chains, binders, hooks, etc.
        vi. Anchors, pickets
        vii. other
    b. Lifting equipment
        i. Pneumatic
        ii. Hydraulic
        iii. Mechanical
        iv. Farm/excavating/construction equip (operators?)
        v. Heavy wreckers/rotators
        vi. other
    c. Other tools
        i. Digging tools
        ii. Disassembly tools
        iii. Cutting tools
    d. Off-road transportation
        i. UTV's/ATV's
        ii. Other farm equipment (operators?)
    e. EMS (ALS/aircraft, etc)

3. Stabilization:
    a. Self
    b. Scene
        i. ICS
        ii. Safety hazards:
            1. running engine
            2. fuel
            3. coolant, hydraulic oil
            4. other hazardous materials
    c. Tractor/attachments/cargo/towed equipment
        i. Prevent further rolling, sliding, sinking, twisting
        ii. Eliminate tire rotation
            1. Probable stabilization/lift/fulcrum point
            2. Prevent engine re-start
    d. Patient(s)
4. Lifting
    a. Staff
        i. Commander/coordinator/director/?
        ii. Lift equipment operator(s)
        iii. Cribbing placement
        iv. Spotter(s)
    b. Air bag protection
    c. Ground considerations
    d. Cribbing capacities
    e. ~~Lift an inch, crib an inch~~ Crib any amount you lift (wedges)

EQUIPMENT ENTANGLEMENT RESPONSE

OBJECTIVES TO KNOW TO RESPOND SAFELY

PAGED OUT

Location of patient- field, farmstead yard, roadway

Possible hazards—Animals, ground conditions, chemical hazards, access to equipment and patient, weather, can we get our apparatus to the actual site

How do we get to the patient—will someone be located at the roadway to guide responding units?

Where can an air ambulance be landed?

Where do we stage apparatus, ambulance, equipment needed to perform the extrication?

What type equipment will be needed?

- Large wrenches or sockets
- Cribbing
- Lifting equipment, i.e. crane

Who do we contact that is familiar with operations or maintenance [i.e. Implement Technician]?

ON SCENE

Who is command?

- Will it be unified command structure?

Perform 360 degree walk around.

Assign EMS team,

- Extrication team
- Fire safety team
- Safety Officer

Where will be staging?

Where will ambulance helicopter land?

Who will be the liaison with the family?

Is specialized equipment needed to safely extricate the equipment from around the patient?

Will we need to assign personnel for air quality monitoring?

Silo Rescue Concerns

Rescuer Safety – Appropriate PPE
Ventilation and SCBA / SABA

Body recovery vs Live rescue (yes, it is an issue)

Definitions:
Vessels you may encounter –
- Metal
- Glass lined (Oxygen limiting)
- Wood
- Concrete poured
- Concrete stave

Nitrogen Dioxide gas production (happens normally during the fermentation process of any plants) so anticipate it being there. – recommendation 2-3 weeks stay out of silo. If you must go in -run the silo filler / blower or use SCBA.

Extrication from equipment (unloaders)

Ins and Outs
- Exterior ladders
- Interior chutes and ladders
- Hatches and openings

Best routes in and out.
Best routes for patient removal. Normally the way the person enters is the way we go out.
- Blowers – necessary but noisy

Atmosphere – dust, molds, height of structure, confined space
Monitoring
Other needs / concerns
- Ropes and rigging
- Ladders large and small (access a definite problem)
- Patient retrieval devices
  - Backboards vs harnesses vs short spine devices (KED's, LSP Halfback, Skeds, other stuff). Is it designed to be used for this application?
  - C-spine needs.

Other dangers Unloaders, PTO's, augers, electrical hazards, crush points,

THE PLAN

- Know your area.
- What are your potentials for performing a safe rescue?
- Do you need assistance? The answer to this is YES. If you have any other answer than this, you may want to consider other employment (my opinion).
- Equipment and personnel available.
- Incident Command – ALWAYS NEEDED
- Call for all needs while enroute if possible
- ALS needs. LZ area.
- Safety of personnel.
- Ventilation – blowers hooked up and running.
- SCBA / SABA available
- Access to scene and vessel
- Communication needs Noisy area with blower running
- EMS supplies up and down

Aerial Apparatus High-Point Rigging

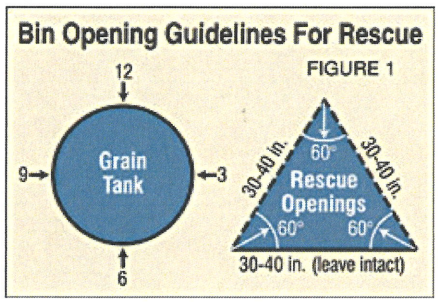
Rope rescue principles are far more in depth than this session will cover. Please seek further training following NFPA 1006 and 1670 to increase knowledge and skill. However, if you find yourself in a situation in which you must use an aerial, rope, and rigging to affect a rescue, here are some points to assist in safe operations.

- Assign an Incident Safety Officer
    - Consider an Assistant Safety Officer if the ISO is not well versed
- Know and follow apparatus manufacturer recommendations
- Know your apparatus tip load (500, 750, 1000lbs)
- Equalize load between anchor points
- Understand the basic physics in rigging
    - Loads (rescuer, equipment, patient, water in waterway)
    - Angles (angles can minimize loading or multiply it)
    - Forces (Load at rest vs dynamic or "moving")
        - Change of direction may double the force applied to the aerial (lever)
- Use both Main and Belay (safety) lines if possible
- Consider Tag-lines
- Safety Check all rigging before anyone, or anything is loaded on the system
- Go Slow and Communicate (1:1 communications between patient attendant and aerial operator)

Notes:

Grain Bin Rescue – SOG Sample

- Make sure all equipment is ordered (Ladders, EMS, Air, Utilities, equipment to move grain if bin is opened, rescue saws, ventilation, harnesses, lift device for patient – harness, LSP Half back, other _____.
- Upon arrival – Make scene safe
- Turn off all power to bin or device creating entrapment / lock out tag out
- Check for overhead power lines
- All entry personnel wearing harnesses and secured to solid anchors– Appropriate PPE – Portable radio(s) for interior crew (headsets may be necessary)
- Contact with the patient (rescue vs recovery)
- Is ventilation required? Make it so – Interior fans without heat
- Ready equipment – ropes, coffer dam, place aerial devices if cutting is required or if used as overhead lift /safety point
- Utilize coffer dam and rescue auger and or other devices (vacuum cleaner, vacuum trucks, buckets) to safely remove grain from patient area.
- If emptying of bin is required (total submersion) utilize Bin Opening guideline for safe procedure.
- Have enough grain removal equipment on scene to remove from the area as the grain is removed (Skid Steers, end loaders etc.)



- **Continually evaluate safety throughout incident (Assign Safety Officer) for 360-degree monitoring of vessel. Also rehab rescue staff as needed.**
- Don't forget the other patients on scene (family) have appropriate personnel on scene to assist with this.
- Documentation (on going if possible) – post incident mandatory.

PHOTO CREDIT: EARL DOTTER

SILO GAS

COMMONLY ASKED QUESTIONS

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

National Farm Medicine center

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 upright silo. It is heavier than air, so it settles at low points in the enclosure. High levels of nitrogen gases also occur in silage bags and covered bunkers. Nitrogen levels in silage may be higher during times of prolonged drought and rain just before ensiling or if excessive fertilizer was applied.

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. If a person has difficulty breathing or is not alert after an exposure, medical assessment at a clinic or hospital is recommended.

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

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 for at least the first three weeks after filling, unless trained in the use of a self contained breathing apparatus (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.

If it is absolutely necessary to enter a silo in the first three weeks, the recommendations are to wear a SCBA and monitor the environment for nitrogen gases. Gases can be monitored using a one-time use detector tube or continuous reading meters. Once the silo is filled, leveling or capping should be completed immediately. If this can't occur, the same day, one load should be saved to add prior to leveling or capping.

If recently filled silos are entered without those precautions, then the doors should be opened and the vents run for at least 30 minutes prior to entering and continually while in the confined space. Family members or co-workers should be notified and ready to observe and call 911 if the person goes down. Observers should not enter themselves to perform a rescue. This is not recommended and is not a fool proof method as farmers have been seriously injured even when these precautions have been taken. It is also important to ventilate any structures that connect the silo with areas that house animals and workers.

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For more information, call us at 1-800-662-6900 or visit our web site at http://www.marshfieldclinic.org/nfmc

2708-002

MANURE GASES

COMMONLY ASKED QUESTIONS

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.

National Farm Medicine center

WHAT IS MANURE GAS?

Manure gas is actually a name used for several different gases formed by decomposition of manure. The gases of most concern are ammonia and hydrogen sulfide. Other gases of concern include methane and carbon dioxide. 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 in particular hydrogen sulfide are heavier-than-air, they tend to settle in low areas of manure storage or accumulation. Ammonia, 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, on calm, hot humid days, 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.

WHAT IF A MANURE PIT NEEDS TO BE ENTERED?

Never enter a pit unless you have specialized training and equipment. Disposable dust respirators and chemical cartridges are not adequate protection to safely enter a manure storage area if the concentration of hydrogen sulfide and oxygen is not known. 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 properly trained to use a self-contained breathing apparatus (SCBA). 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.

No one should enter a manure pit or lagoon without a SCBA or first inspecting the gas levels with a detector tube attached to an air pump to check hydrogen sulfide levels or preferably a reusable continuous reading electronic meter to monitor oxygen and hydrogen sulfide. An environmental testing firm or university extension safety specialists can be contacted for recommendations on specific equipment and costs.

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. High concentrations of hydrogen sulfide can cause sudden loss of consciousness without warning. 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 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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SAFERFARM.ORG

MAKING HAZARD ANALYSIS SIMPLE

Safer Farm is an ever-evolving online tool. Development is led by the National Farm Medicine Center to make agricultural health and safety knowledge accessible and easy to use.

Safer Farm is a redesign of the Hazard Analysis Tool (FARM-HAT) developed at Penn State University. Safer Farm is a simple method for identifying hazards, evaluating their seriousness, and for ranking and correcting them.

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National FarmMedicine Center

GOAL

SaferFarm.org is a free mobile-friendly website developed to assist in the hazard analysis process. The goal is to enable everyone to make their farm operations safer, so they can continue to do what they love--farming.

HAZARD IDENTIFICATION

Typical hazard checklists come in a safe/unsafe or yes/no format, but hazards are complex--they have varying degrees and ranges, especially when it comes to correcting them and protecting farmers. Safer Farm gives you the ability to describe the risk posed by the hazard.

EVALUATING HAZARDS

SaferFarm.org and the Farm Hazard Analysis Tool offer text descriptions and reference photos on what to look for when evaluating a specific hazard.

RANKING AND CORRECTING HAZARDS

Hazard ranking allows an individual to identify the level of risk posed by a hazard. Ranking gives an objective way of describing the range of a hazard. Safer Farm creates a report so farmers can correct hazards and improve safety on their operations. Mitigating these risks can possibly reduce insurance rates.

SaferFarm.org

Most Critical Farm Hazard Inspection Items

FARM-HAT/Safer Farm Items

- Tractors
  - ROPS
  - Seatbelt
  - PTO master shield
  - Tractor seat
  - Rear brake pedals
- Ag Machinery
  - PTO drivelines
  - Machine master shields
  - Augers
  - Hydraulic hoses
  - V-belt, chain and gear drives
- Off Road Vehicles & Machines
  - Skid Steer Operator Restraint
  - Skid Steer Hydraulic Lockout
  - ATVs
- Animals-Livestock
  - Bull handling
  - Bull pens and stalls
  - Fencing
  - Working alleys
- Pesticides and Chemicals
  - Pesticides Spill & Leak Containment
  - Pesticide Security Systems
  - Pesticide Storage
  - Diary Cleansers-Sanitizers
- Ag Buildings
  - Workshop Heating
  - Fire extinguishers
  - Flammable Liquid Storage
  - Lightning protection
  - Electrical Panel door
  - Electrical Wiring

Important items not in SaferFarm.org

- Manure Pits
  - Gas detection equipment
  - Danger signs at entry points of pits
  - Harness, safety line and tripod
  - Entry point is secured
  - Ventilation system for pit
- Upright Silos
  - Silo blower in place
  - Silo blower ladder in good condition
  - Silo blower door in good conditioned and closed
- Bunker Silos
  - Silage face shows no evidence of undercut
  - Defacer machine can reach top of storage face
  - Silo is protected from entry by children and unwanted visitors
- Grain bins
  - Grain entry warning signs posted
  - Electrical service has lockout-tag out capability
  - Entry ladder is in good condition
  - Bin cap is on and in good condition