

# **SAFETY AND HEALTH MANAGEMENT IN THE WORKPLACE**

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SAFETY PRECAUTIONS AT WORKPLACES IN  
MOST CASES INVOLVES USE OF COMMON SENSE  
BUT COMMON SENSE IS NOT ALWAYS VERY  
COMMON

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# Why manage safety and health?

- Every working day in Great Britain at least one person is killed and over 6000 are injured at work.
- Every year  $\frac{3}{4}$  of a million (750,000), people take time off work because of what they regard as work related illness
- About 30 million work days are lost as a result.
- Accidents and ill health are costly to workers and their families, employers and country's economy
- they may lead to damage to property or equipment, and lost production.
- Compensations, litigation, lost production time, stoppages etc

# COMMON WORK HAZARDS

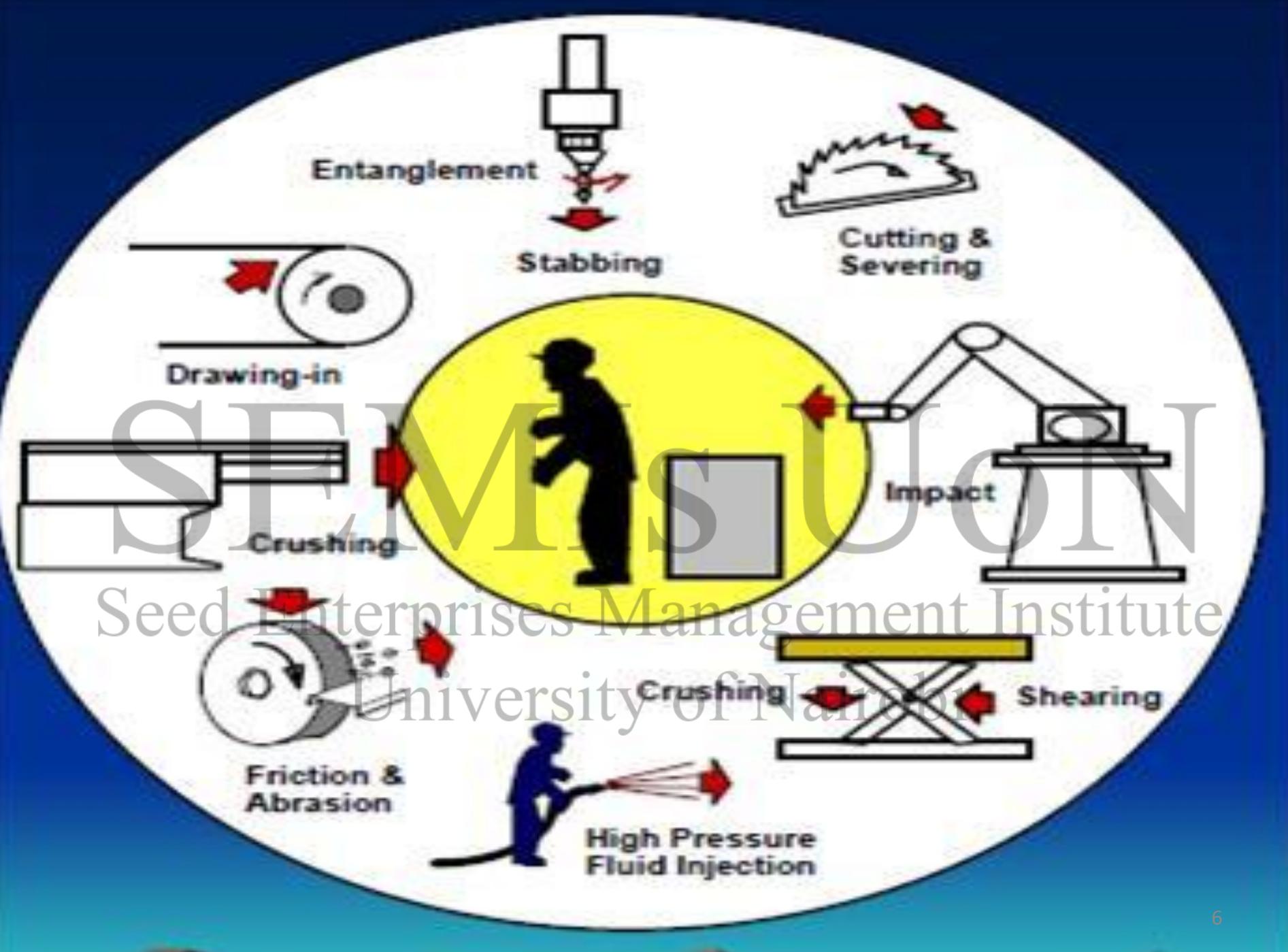
- MACHINERY
- ELECTRICITY
- FIRE
- CHEMICAL
- CONSTRUCTION
- PLANT
- TRANSPORT

# MACHINERY SAFETY

## Common Sources of Machinery Risk

- contact or entanglement
- crushing
- being struck by ejected parts
- being struck by material ejected

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Entanglement

Stabbing

Cutting & Severing

Drawing-in

Impact

Crushing

Crushing

Shearing

Friction & Abrasion

High Pressure Fluid Injection

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# Machinery Safety

- Other non- mechanical hazards associated with the use of machinery:
  - Electricity;
  - Heat;
  - Noise;
  - Vibration;
  - Radiation;
  - Hazardous materials and substances; and
  - Ergonomic hazards.

# Control Options

## Engineering controls

- The most effective risk control measures are those implemented at the machine/work equipment design stage;
- In order to achieve this, manufacturers and suppliers need to carry out a risk assessment and
- demonstrate that all risks associated with the machine are adequately controlled by design, rather than by procedural controls.

# Physical controls

- Safeguards and safety devices
- The main types of safeguards and safety devices can be classified as follow:
  - fixed guards;
  - fixed guards with adjustable elements;
  - automatic guards;
  - interlocked guards; and
  - Safety devices including trip devices, such as photoelectric light curtains, pressure sensitive devices and two-hand control devices.

The background image shows a blurred industrial environment, likely a seed processing plant. A prominent feature is a vertical red metal structure with a dark mesh screen. To the left, there are blue and green mechanical components. The lighting is bright, typical of an indoor industrial facility.

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# Human Factor Controls

- An important risk control measure for preventing machinery and work equipment accidents is a ***well-trained, well-disciplined and effectively supervised workforce.***
- The workforce must receive regular training in order to operate machinery and equipment safely

- The training should enable trainees to reach the desired levels of competence, to gain a clear understanding of the safety systems, procedures and the hazards and the emergency procedures
- Employees should only operate machinery and equipment for which they have received training and have been authorized to use.

# Electricity Safety

- Risks from Electricity Include
  - Electric shock;
  - electric burn;
  - fire;
  - arcing; and
  - Explosion.

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# Electric burn:

- The passage of an electric current through the body may result in body tissue burns, which tend to be deep seated and therefore difficult to heal.
- Contact with high voltage is often characterized by body burn marks at the current entry and exit points, such as the hand palms and soles of the feet in the case of a hand-to-feet shock path.

# Fire:

- Fire may be the result of heat generation due to the overheating of cables or electrical equipment.
- Arcing, which arises from short-circuit flashovers or sparks that are generated within electrical equipment such as motors or switching devices, may provide an ignition source for adjacent flammable materials, such as solids, gases, vapours and dusts.

# Explosion:

- Some work processes can generate static electricity, which acts as an ignition source, as well as creating a potentially explosive atmosphere.
- Examples include processes that involve the movement of particulates or the dispersion of liquids through nozzles.
- lightning represents the creation and dissipation, through lightning flashes, of extremely large static electricity charges.
- Lightning strikes have the capacity to cause fatal accidents to people and severe damage to buildings.



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# Controls Options

- **Connections**

- Electrical joints and connections should be mechanically and electrically suitable for use.

## **Excess Current Protection**

- Protection should be provided in order to protect every part of a system from excess current.
- **Working Space, Access and Lighting** Adequate working space, access and lighting should be provided, which is particularly important in the case of live work.
- Electrical insulation, such as cable insulation;

# Management Controls

- **Safe Systems of Work – Work on isolated equipment**
- Isolation from all points of electrical supply;
- earthing, in order to discharge any residual electrical energy and to prevent the build up of induced charges;
- Confirmation of isolation at the point of work;
- Demarcation of the safe zone of work;
- Preparation of safety documentation, such as permits to work;
- The removal of fuses; and
- The use of hazard warning signs.

# FIRE SAFETY

- Typical consequences of fire can include:
- injury or death of employees;
- loss of plant, product and/or information;
- disruption to production and supply of goods;
- management time spent investigating/reporting/carrying out rework;
- investigation/enforcement action by regulatory authorities;
- prosecution/fines and increased insurance premiums;
- damage to the environment; and
- community concerns.

# Components required for a fire to start:

- a combustible substance (the fuel), such as wood, paper or plastic;
- oxygen (usually from air); and
- a source of heat (the ignition source).
- It is only if these three components are present that a fire can occur. These three components are often referred to as the fire triangle; see Figure 1. If one of the components is removed then the fire will be extinguished.

# FIRE TRIANGLE



**Oxygen** **Fuel**

**FIRE**

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# Control Options

- Control options for fire safety comprise three essential elements:
- **fire prevention**, in order to prevent fires from occurring;
- **fire protection**, in order to minimize the impact of a fire on equipment and people once the fire has started; and
- **fire suppression**, in order to extinguish a fire.

- **Prevention** entails eliminating or reducing the:
  - sources of fuel; Sources of ignition; or
  - sources of oxygen.
- **Fire protection** building design, such as fire resistant structures,
- fire alarms and systems;
- emergency shut-down systems

# Fire Suppression

- **Fire suppression** requires the effective application of one or more methods of extinguishment,

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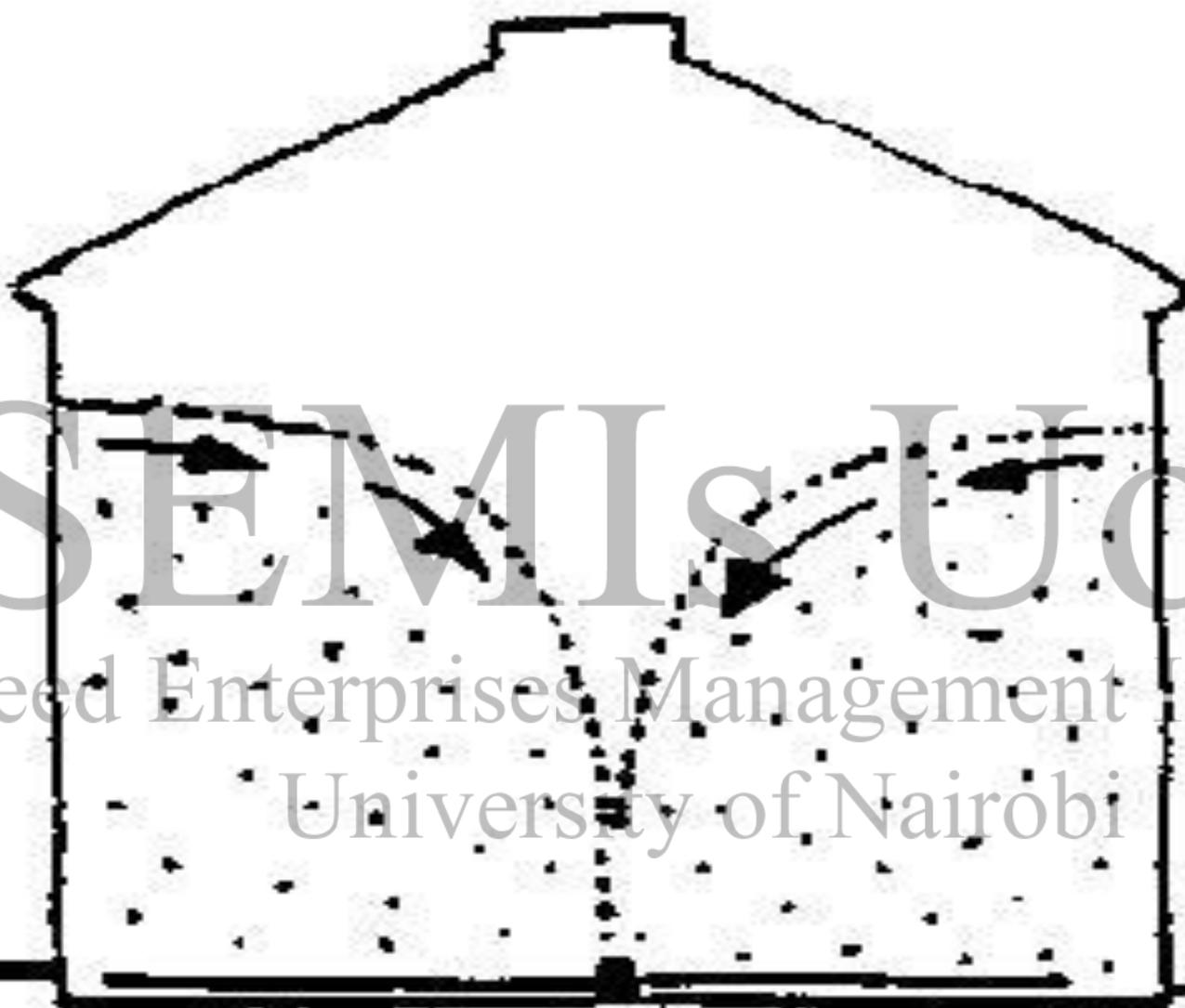
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# COMMON HAZARDS IN SEED PROCESSING

- Seed Processing can be divided into the following sections:
- **Harvesting**
- Transportation
- **Storage**
- Conveying
- **Processing**

# SAFETY HAZARDS IN STORAGE

- **Suffocation**
- Suffocation in grain bins usually occurs when a person is buried while the bin is being emptied.
- Flat-bottomed grain bins emptied through the center of the bin floor
- A person entering the bin will be carried to the center and quickly drawn under in this column of grain.
- Typical unloading rates will completely bury a worker in less than a minute. In addition, some grains, such as flax and millet, cannot support a person, even when still.



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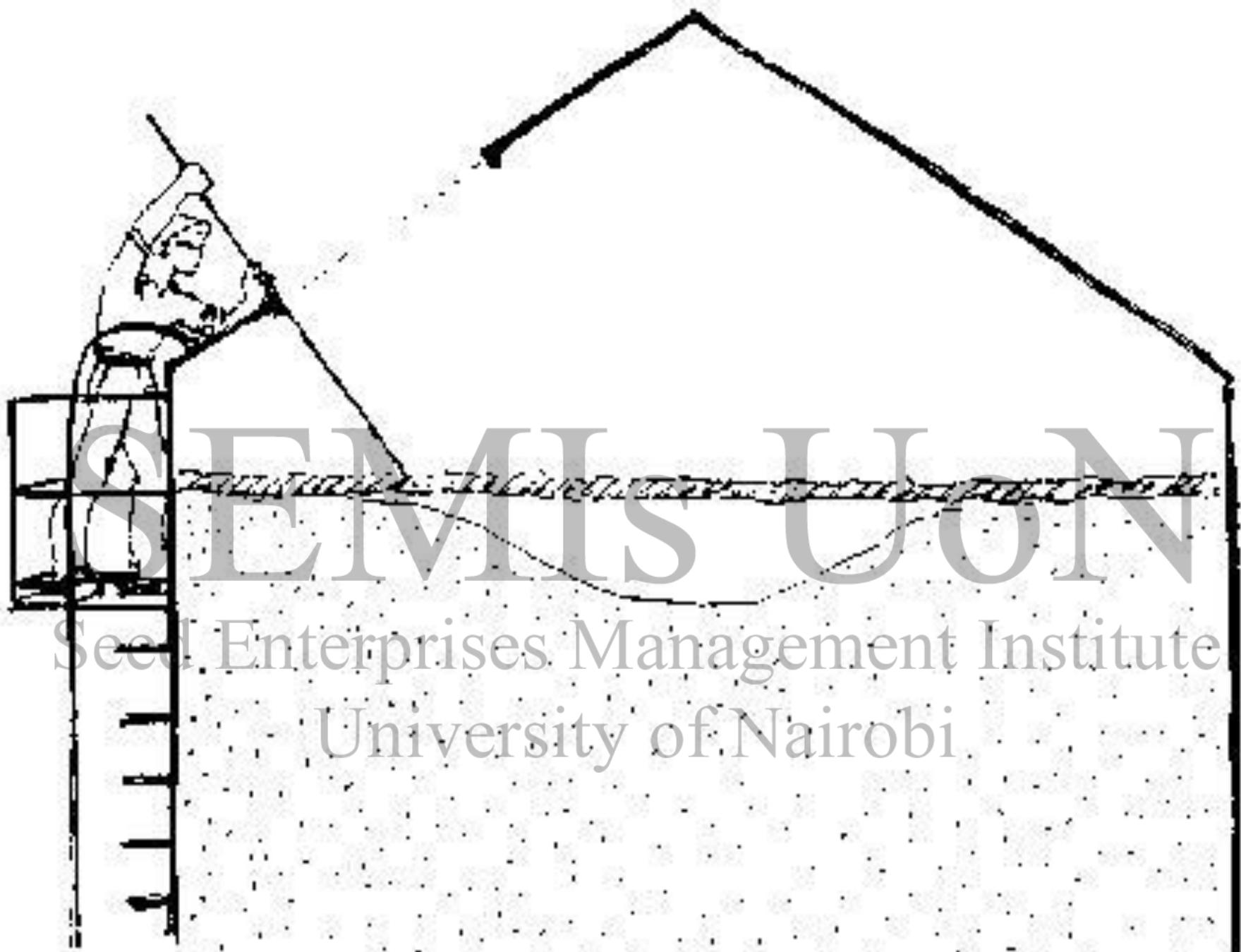
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- The suffocation hazard can be eliminated by never entering grain-storage structure when it is being loaded or unloaded.
- The power to all conveying equipment, automatic and manual, should be shut off, locked, and tagged to prevent unexpected operation
- Consider installing a permanent ladder on the inside of all grain bins.
- If workers **must** enter the bin and unloading starts in spite of proper shut-off, lock-out precautions, they may be able to get to the ladder and climb to safety.

- Caked or frozen grain is also a suffocation or crushing injury threat.
- If a bin has been partially emptied below a crust of grain, someone who steps on the crust while attempting to break it up can fall through and become buried.
- Workers should always assume all surfaces are bridged.
- Break up surface crusts from outside the bin with a wooden pole—not a metal one—or a weighted line thrown through the bin door

- Metal poles, pipes, or lines are electrocution hazards, since they may contact overhead power lines near the grain bin.
- You might consider mechanical agitation or vibration equipment to assist in breaking up badly crusted grain from outside the bin

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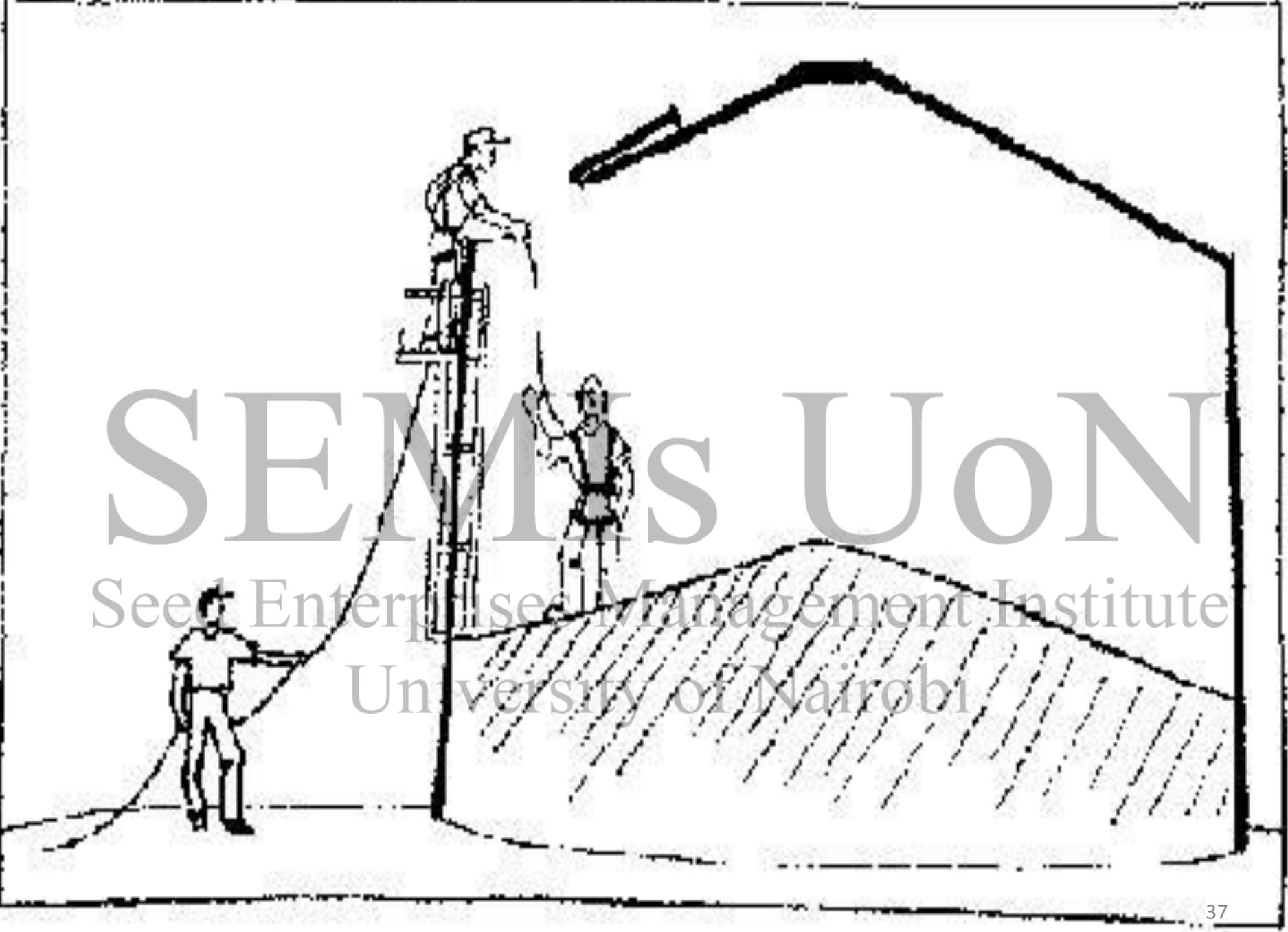


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- Frozen or crusted material sticking to walls can fall on someone trying to break this material loose, crushing or suffocating the worker.
- Workers should always remember that it takes very little grain to entrap and suffocate a person.
- Never enter a storage structure below material that is sticking to the sides of the structure or caked on a wall.
- Break up this material from above.

- A suffocation hazard also exists from the gases given off from spoiling grain.
- For example, the carbon dioxide (CO<sub>2</sub>) given off is heavier than air and will collect above the grain surface.
- You cannot smell, see, or taste the CO<sub>2</sub>.
- If enough gas has collected to decrease the oxygen concentration from the normal 21 percent to less than 19.5 percent, you will think less clearly, become drowsy, lose consciousness, or even die.
- Workers who fall through crusted grain can be killed by CO<sub>2</sub> that has collected under the crust, even if they are not completely buried.

- If a grain bin must be entered, three people should be used
- The person entering the structure should wear a harness attached to a lifeline.
- A second person should remain at the bin entrance to watch the person inside the bin and keep tension on the lifeline
- The third person should remain on the ground to go for help.
- All of the unloading equipment should be turned off, locked, and tagged.
- If the bin has a ventilating fan, it should be turned on to thoroughly ventilate the bin before entry and should be left on as long as a person is in the bin.

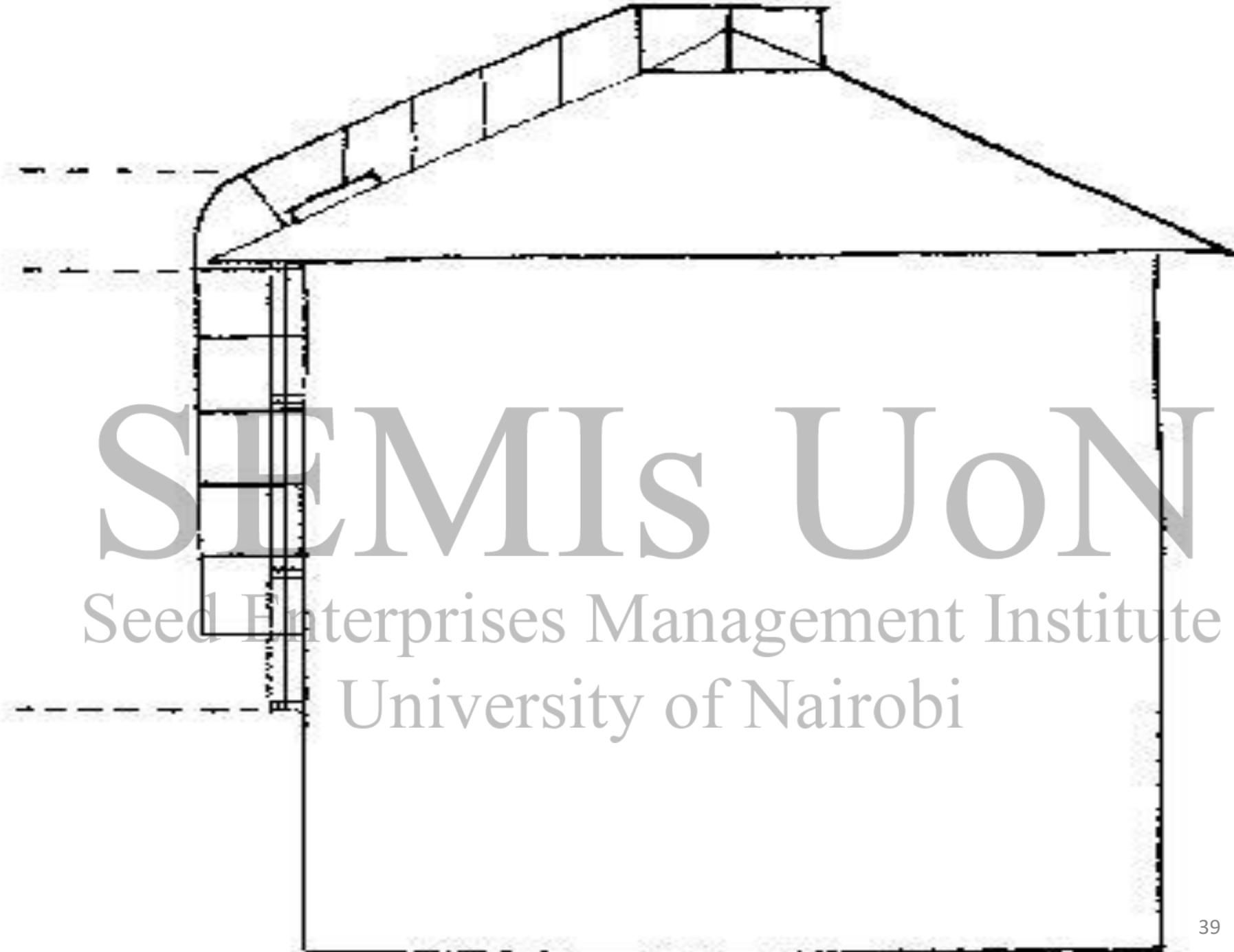


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# Falling hazards

- Falls from machinery and structures is another hazard.
- Research has shown that falls that seem fairly short, 12 to 20 feet for example, can kill a person.
- Some falls can be prevented by simple safety practices.
- For example, keep all ladders in good condition and avoid climbing them in wet or icy conditions.
- Permanent ladders more than 20 feet long should be surrounded by a safety cage which will support the weight of two workers.



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- Falls can occur as workers move from the vertical exterior ladders on grain bins to the bin roof or through a bin entrance.
- Handrails extending 3 1/2 feet above the end of ladders will help workers get onto and off the ladders.
- To prevent falls while accessing the center roof openings on grain bins, consider installing guardrails along the roof ladder and around the center roof cover.

- Equipment is also available to prevent serious injuries in case a fall does occur.
- Most of this equipment uses a waist belt or body harness
- A body harness is better than a waist belt or a loop of rope around the waist or under the arms, since the harness spreads the force of a fall over a larger part of the body (Figure 8).



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# Fires, Explosions, and Electrocutions

- Fires, explosions, and electrocutions are not as common as falls, but can have equally severe results when they do occur.
- Fires and explosions in grain storage are generally due to dust or grain-drying equipment.
- The risk of a dust explosion or fire can be reduced by preventive maintenance.
- Installing dust control systems
- Regularly checking and servicing bearings, belts, and conveyors will help to prevent overheating from lack of lubrication, slippage, or rubbing.

- Thoroughly ventilating the bins with the dryer fans before igniting the dryer will reduce the risk of a fire or explosion from leaking fuel.
- Regularly cleaning grain material from the inside and outside of grain dryers will decrease the chances of a fire.
- The risk of a fire can also be reduced by keeping the air intake screens clean and in good condition so combustible material cannot be pulled in with the air.

# CONVEYING

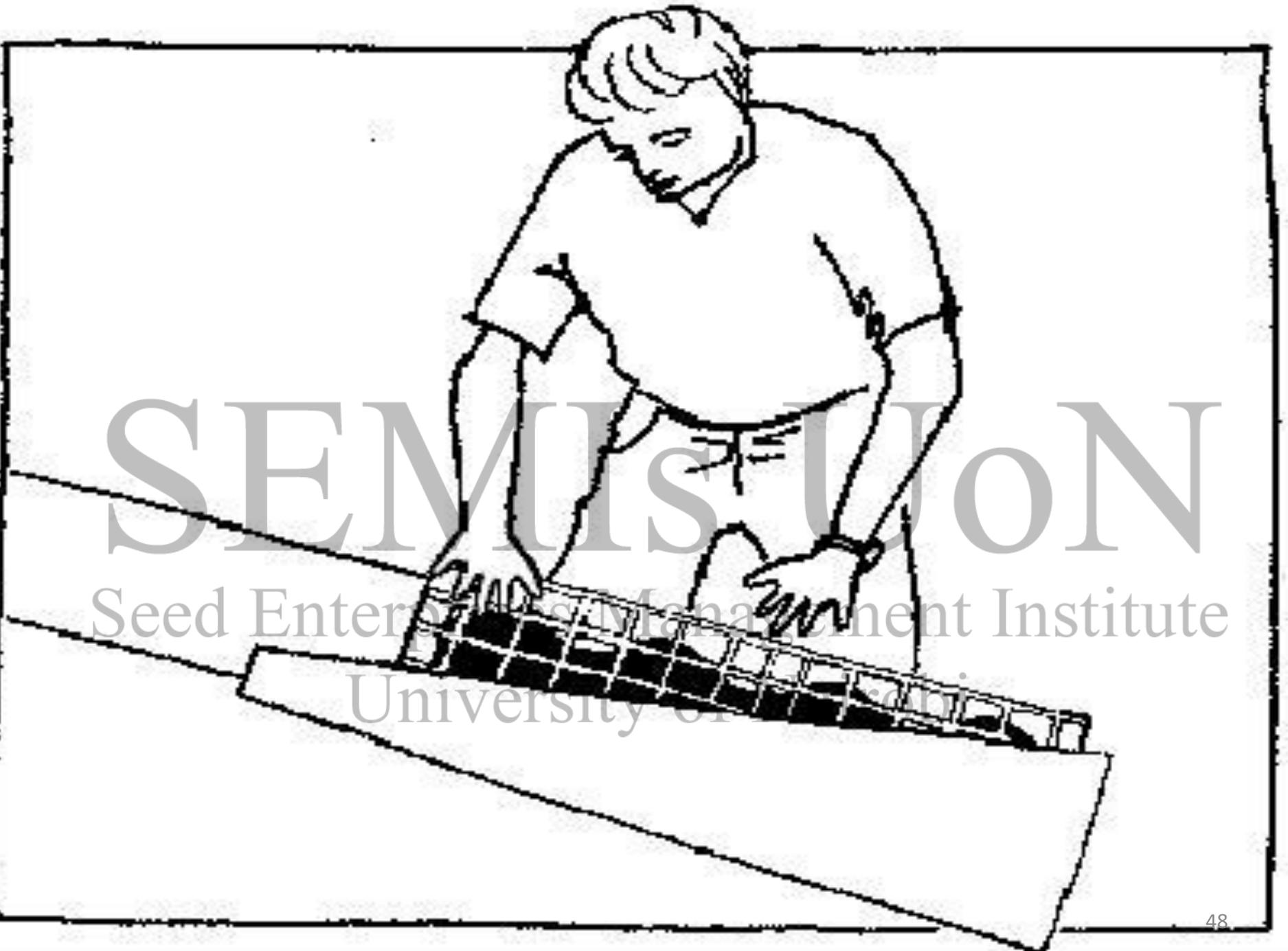
- Entanglements involving equipment, such as augers, combines, and grain wagons, are a major source accidents.
- To prevent contact with grain-conveying equipment, try to work on a stable, level surface.
- For example, place portable conveyors on dry, level ground.
- Consider placing gravel on the unloading areas to provide better footing.
- Grain spills should be cleaned up between each load,
- only after all of the equipment has been shut
- so workers are not standing on loose grain.
- workers will not slip and become entangled if they work with a secure footing.

- Keep your hands and feet from the intake areas of augers and elevators.
- For example, don't level or redirect the flow of grain into the auger or elevator with your hands or feet.

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# Guarding

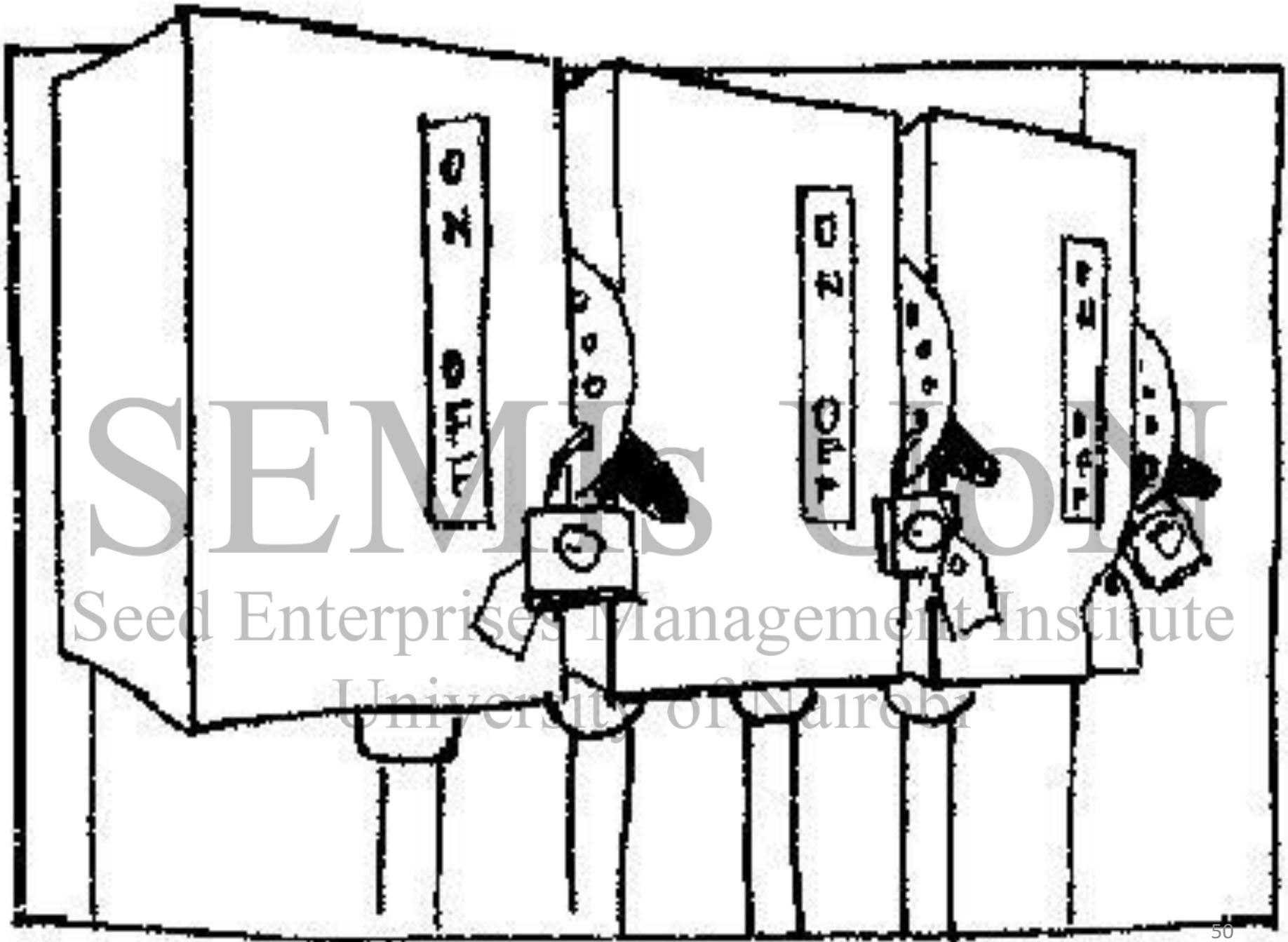
- Guarding can help protect you from injury in case you do slip and contact the machinery.
- Belts, chains, intake areas, and drive shafts of conveying equipment should be guarded.
- Guards should be used on the intake areas of portable grain augers and augers that are part of other machines (Figure 9).



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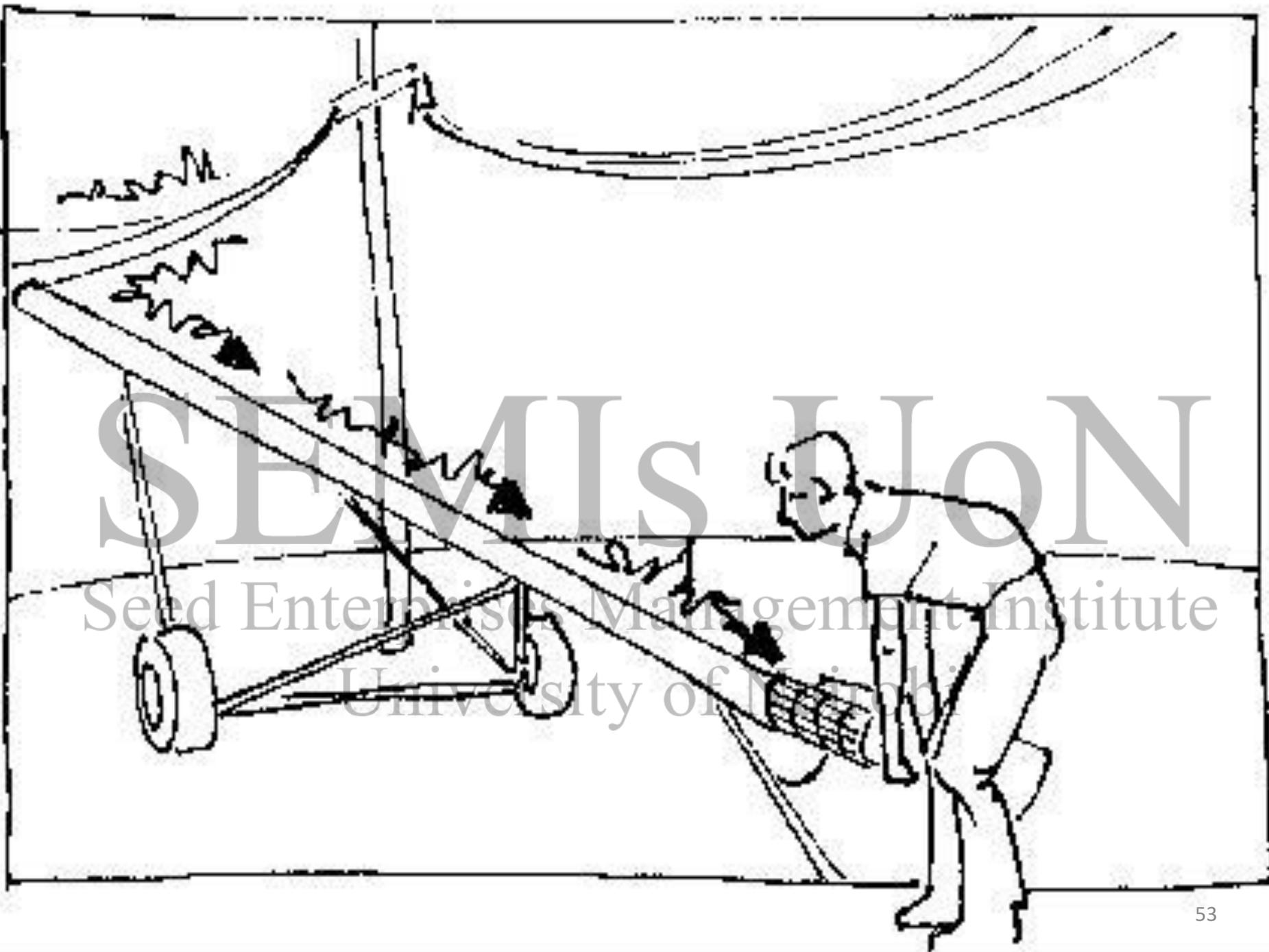
- Always shut off and lock the power to conveying equipment before servicing or unclogging it (Figure 10).
- If the equipment is driven by a power take-off (PTO), shut off the tractor and take the key;
- if it is electrically driven, turn off and lock the power.
- Don't take the chance that the equipment may start or be started while you are working on it.



# Moving Augers and Elevators

- Portable augers, elevators, and blowers also have hazards associated with their transport and placement.
- Augers and elevators can contact overhead power lines or collapse if not handled properly.
- Before moving an auger or elevator, plan your path.
- Leave a minimum overhead clearance of 10 feet between a power line and the equipment.
- Keep the conveyor in its lowered position any time it is being moved.

- If cables are used to raise and lower the auger, check them for broken strands or frayed sections.
- A broken cable can lead to an elevator collapse and possibly a death.
- Make sure that workers not absolutely necessary to raise the conveyor are a safe distance away.



# Safety Slogans

- Don't learn safety through an accident
- Those who work the safest way- live to see another day
- Watch your step - it could be your last tomorrow
- Protect your hands, you need them to pick up your pay check
- Those precious fingers don't ignore. . . Or they could end up on the floor
- Safety - A small investment for a rich future
- Safety is a cheap and effective insurance policy
- Falling objects can be brutal if you don't protect your noodle
- Let's all keep our heads, and other body parts, together
- Safety is no accident
- Don't watch her behind. Keep safety in mind!
- Arms work best when attached to the body

OUR MOTTO:

THINK SAFETY  
WORK SAFELY  
STAY SAFE

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# **SAFETY VIOLATION MEASURES**

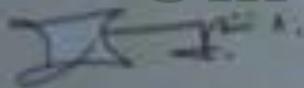
**First Violation — Verbal Warning and Re-training**

**Second Violation — First written Warning**

**Third Violation — Second Written Warning**

**Fourth Violation — Termination**

**(Disregarding Safety)**



**FACTORY UNIT MANAGER**

FIRE  
EXIT



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BREAK GLASS  
FOR  
KEY TO DOOR

SEMs

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A photograph of a red, cylindrical seed container resting on a metal stand. The container is surrounded by a large amount of clear bubble wrap for protection. A white label is attached to the side of the container. The background is a plain, light-colored wall.

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Fire extinguisher instructions: USE FOR PAPER, WOOD, FINE AND LIGHT OIL FIRE. USE FOR WOOD, WAX, OIL, PAINT, SOLID POLYMER, RUBBER, GLASS, AND LIQUID FUELS.

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