

- By Joackim Mutua

SEMI-S - UON

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MANAGEMENT

BY

JOACKIM MUTUA

DEPT OF ENVIRONMENTAL AND BIOSYSTEMS

ENGINEERING

QUESTIONS

- How many have a law on safety and health
- How many have safety and health mgt systems
- OSH Policy
- Safety officers
- Safety committees
- Examination of plants
- Medical exams
- Osh audits
- Fire safety audits
- Fire drills
- etc

A workplace

- A place where goods and services are produced. This a positive side of it.
- Ill health, diseases, accidents and damage to property may occur as unintended products of the work activities.

The tripartite approach

- Good OSH management requires a tripartite approach- Government, Employer, and Employee
- Each organ has specific roles in the management of OSH

GOVERNMENT

- The government provides the national framework for management of occupational health and safety as follows.
- National policy- legislation on occupational health and safety. OCCUPATIONAL SAFETY & HEALTH ACT 2007 and rules have been made
- A department- DOHSS established for the promotion of occupational health and safety.

Government continued

- The national advisory committee on occupational health and safety.
- Occupational health and safety officers for enforcement
- Health and safety advisers have been approved for advice to employers.
- Air quality monitors,
- Engineering Controls Examiner
- Fire safety auditor

Government- Conti--

- Authorised persons have been approved for testing and examination of plants
- Doctors –designated health practitioners
- Institutions have been approved for facilitating quality training.
- The government reviews and updates legislation
- Providing guidelines - codes of practice

Employer- Managing Safety and Health

- Development of policy on occupational health and safety to ensure compliance with the national legislation and best practices.
- set out in writing the occupational safety and health policy.
- Organization of health and safety function
- Planning and implementation of policy
- Measuring performance
- Reviewing performance

Safety and Health Policy

- The policy for the organisation should be concise, clearly written, dated and signed by the most senior accountable person
- Included a clear statement of commitment
- Should give direction and influence activities.
- Involve workers for ownership
- Be readily accessible to all workers
- Be made available to other interested parties
- Be reviewed for continuing suitability.

Organizing OSH functions- control

- Provide strong leadership and commitment to OSH by appointing a senior manager to take charge of the health and safety function.
- Assign responsibility for safety to every person so that managers, supervisors, and employees in the organisation know what performance is expected of them.
- Integrate health & safety in all company functions
- Set up a health & safety committee.
- Set targets -expected performance of every worker
- Provide resources for the health & safety activities.

Organizing OSH functions- Competence

- Recruit competent employees and contractors.
- Assess the skills to carry out all the tasks
- Ensure that the managers, supervisors and workers are adequately instructed and trained skills to carry out tasks safely
- Provide for newly employed persons to undergo adequate induction
- Arrange for a suitable induction for all visitors on site.
- Train adequately members of the Safety and Health Committee.
- Arrange for access to sound technical advise-appoint OSH adviser.

Organizing OSH functions- Cooperation

- Involve workers in OSH matters for synergy and ownership.
- Clearly spell out employee responsibility in OSH matters.
- Coordinate and cooperate with contractors at your workplace
- Chair meetings
- Motivate workers through incentives
- Encourage employee involvement in safety matters even at individual level

Organizing OSH functions-Communication

- Provide information on hazards and preventive measures to employees and contractors
- Discuss openly health and safety regularly
- Make health and safety visible— posters, signs

Planning and implementation

- Setting objectives- what you want to achieve-agreeing on OSH targets with managers
- Identifying hazards and assessing risks – deciding how to eliminate them.
- Complying with the legislation and best practices
- Developing Safe work procedures
- Setting standards against which performance will be measured
- Implementing the standards of performance

Measuring your performance

- What did you plan to achieve? Expected performance.
- Where are you now?-Actual performance. Establish whether targets and standards have been achieved. Whether the solutions in place are effective?
- What is the difference- (performance gap-deficiency) and why?

Monitoring systems- proactive

- Active monitoring – looking at things before things go wrong. Do not Condone Murphy's law.the following tools should be used;
 - Regular workplace inspection of the organisation itself (self inspection)
 - Annual health and safety audits by external agency
 - Medical examinations of workers
 - Thorough examination of plants by approved persons.

Monitoring systems-reactive

- After things go wrong. Investigating injuries, cases of illness, property damage, near misses
- In each case determining why performance was not to standard
- What improvement to undertake?

Reviewing effectiveness of your policy

- Degree of compliance with health and safety compliance standards
- Areas where standards are non existent or inadequate
- Achievement within set time scales
- Accident, illness data –analyses –trends and common features
- Lessons learned from your mistakes and success.

EMPLOYEE ROLE

- To cooperate with their employer to ensure success of the policy
- Be interested in learning and developing skills on OSH
- Comply with all safe work procedures and practices
- Make use of the protective appliances provided for use
- Report all unsafe conditions, acts and practices noted

Way forward

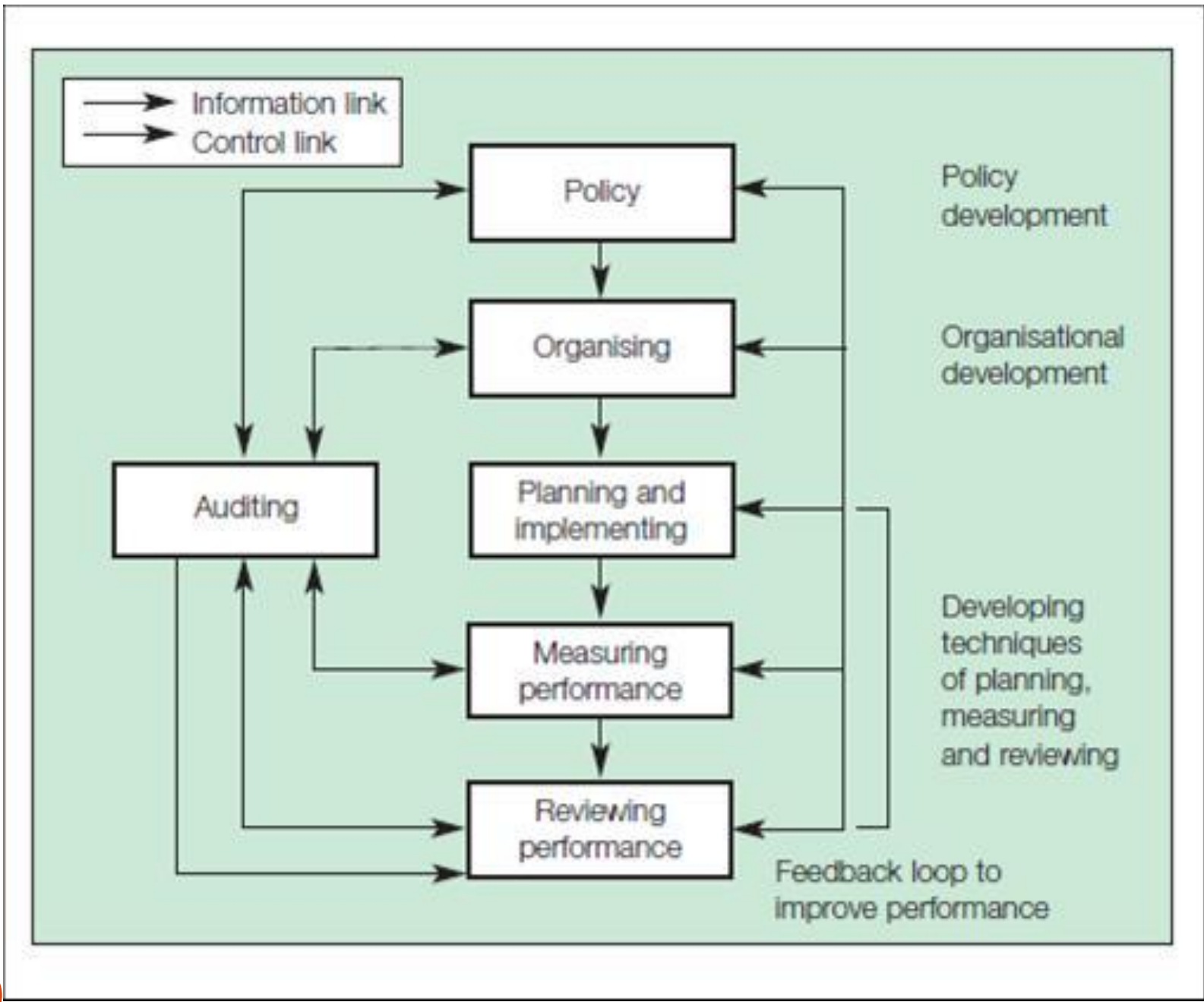
- Manage health and safety just as you manage other functions of the Organization to Protect people and control loss.
- Act today - Do not wait to react to an accident tomorrow.

PREFERRED HIERARCHY OF RISK CONTROL PRINCIPLES

- The following is a summary of the preferred hierarchy of risk control principles:
- **Eliminate risks** by **substituting** the dangerous by the inherently less dangerous, eg:
 - use less hazardous substances;
 - substitute a type of machine which is better guarded to make the same product;
 - avoid the use of certain processes, eg by buying from subcontractors.

- **Combat risks** at source by **engineering controls** and giving collective protective measures priority, eg:
- separate the operator from the risk of exposure to a known hazardous substance by enclosing the process;
- protect the dangerous parts of a machine by guarding;
- design process machinery and work activities to minimise the release, or to suppress or contain airborne hazards;
- design machinery which is remotely operated and to which materials are fed automatically, thus separating the operator from danger areas.

- **Minimise risk by:**
- designing suitable safe systems of working;
- using personal protective clothing and equipment; this should only be used as a last resort.
- The hierarchy reflects the fact that eliminating and controlling risk by using physical engineering controls and safeguards is more reliable than relying solely on people.



SAFETY AND HEALTH MANAGEMENT IN KENYA

Occupational Safety and Health in Kenya

- The law to regulate health and safety in Kenya has been in existence since 1951; as “The Factories and Others places of work act, cap 514.
- The Directorate of Occupational Safety and Health Services(DOHSS) – Ministry of labour Is charged with the implementation of the Health and Safety legislation
- Current act: Occupational Safety and Health Act, 2007 (OSHA, 2007)
- Came in to effect in 2007 and repealed The Factories and Other Places of work act, Cap 514.

- AN ACT of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes

- DOHSS is responsible for ensuring that necessary and adequate provisions are made at all work places for the prevention of occupational diseases and accidents; promotion of workers' health, safety and welfare as specified under the relevant ILO Conventions and national safety and health laws and regulations.
- The department's services in this area are beneficial not only to the workers but also the employers that benefit from high productivity and safety for their equipment and other facilities.

- The directorate has officers in National, provincial and district levels. Their work is to inspect all workplaces and ensure the workers safety is fully addressed.
- The officers have powers to issue a stop or an improvement order. They can also take you to court if you are not complying with the law.
- Apart from the Occupational Safety and Health Officers who are GOK employees, DOHSS approves competent people to undertake safety and health audits, Medical exams, first aid training, plant examination, health and safety training, fire safety audits and training, etc.
- These approved persons are categorized as follows:

Categories of approved persons / Institutions

- Approved Plant Inspectors / Examiners
- Approved Training Institutions
- Approved OSH Advisers
- Approved Fire Safety Auditors
- Approved DHPs

SUBSIDIARY LEGISLATION

- Woodworking machinery rules-L.N 431/1959
- Docks rules L.N 306/1962
- First aid rules- L.N 160/1977
- Eyes protection rules L.N 44/1978
- Electric power special rules L.N 340/1979
- Cellulose solutions rules L.N 231/1957 revised,
- Building operations and works of engineering construction rules L.N 40/1984
- Health and safety committee rules-L.N 31/2004
- Medical examination Rules L.N24/2005
- Noise prevention and control Rules, L.N25/2005
- Hazardous Substances Rules, L.N.59/2007
- Fire Risk Reduction Rules L.N.60/2006

- The health and safety committee rules requires all employees which employ 20 workers and above to form safety and health committees which should comprise representation from both workers and management.
- The committee oversees the health and safety issues at the workplace.
- The rules also require the members to undergo a basic training in health and safety

- The directorate has come up with a syllabus which covers such topics as Machinery safety, electrical safety, chemical safety, fire safety, construction safety, HIV / AIDs awareness, Personal protective equipment/clothing, Occupational hygiene, first aid at work etc. The training takes 4 days and is conducted by approved training institutions.

Health & Safety Training Timetable

TIME DATE	8:30-10:00	10:00-11:00	11:00 - 11:30	11:30-1:00	1:00 - 2:00	2:00-3:30	3:30 - 4:00	4:00-5:00
Day One	Course opening Health & Safety Management	Health & Safety Management	B	Machinery Safety	L	Plant safety	B	Electrical safety
Day Two	Health & Safety committees (composition, duties and operations)	Health & Safety committees (composition, duties and operations)	R	Chemical Safety	U	Fire Safety	R	Machine and manual Handling of Goods and materials
Day Three	Occupational health overview of causes of occupational disease & their management	Stress Management/ Drug & Alcohol abuse	E	Occupational hygiene (dust, fumes and noise hazards)	N	First aid management at workplaces	E	HIV / AIDS An Overview
Day Four	Occupational Accidents	Personal Protective Equipment (P.P.E.)	A K	Workplace inspection techniques	C H	Workplace inspection techniques (Practical)	A K	Official Closing

Safety and Health Audits

- The act requires all employers to conduct safety and health audit once in every period of 12 months
- They are supposed to hire the services approved OSH advisers to do the audit
- The audits should be done by approved OSH advisers who prepares a report and submits a copy of the report to DOHSS for follow-up.
- The directorate has come up with a code of practice for health and safety auditing to ensure nothing is left out.

Contents of safety audits

- Workplace Information
- Management of Occupational Safety and Health Policies
 - Safety and Health Policy
 - Assignment of Responsibilities
 - Organization for Safety and Health in the Company
 - Implementation of Safety Policy
 - Performance Monitoring
 - Occupational Safety and Health Training Programmes
 - Occupational Health Service Programmes,
 - List of Common ailment or complaints in the workplace
 - Medical Insurance Scheme
 - Employee Medical Examination,
 - Accident Information,
 - Information Systems,
 - Permits-to-Work,
 - Contractors & Suppliers,
 - Emergency Response Plan.

Contents contd

- Workplace Safety, Health and Welfare Conditions

- Safety
- Machinery Safety,
- Chemical Safety,
- Plant Safety,
- Electrical Safety,
- Fire Safety and
- Construction Safety;
- Transport Safety

- Occupational Hygiene Conditions

- Personal Protective Equipments,
- Ventilation,
- Overcrowding,
- Lighting,
- Noise,
- Vibration,
- Radiation,
- Thermal Conditions,
- Pressures

- General Conditions

- Ergonomics
- Storage and Handling of Materials
- House keeping
- Welfare Facilities

- The act also requires workplaces to carry out risk assessment for all their activities to establish the risk levels and put control measures to minimize the risk.
- The act also classifies some machines and equipment as plants.
- These are things like steam boilers, lifting equipment, air receivers, steam receivers, etc. The reason is for safety.
- The act also requires all plants to undergo periodic examinations by an approved person and a report is submitted to DOHSS for follow-up.

- The act also requires all work places conduct a fire safety audit once in every period of 12 months.
- This is done by approved fire safety auditors.
- The act also specifies dangerous processes and work.
- It requires workers who are exposed to dangerous work processes to undergo various types of medical exams to establish the levels of damage.
- If one is found to be affected, he should be redeployed to another area. This is done by approved DHPs

- Workplaces include: Industries/ Factories, hospitals, hotels, construction sites, agriculture based processing establishments like tea factories, coffee estates etc. All sectors are covered.
- Finally the act requires all workplaces to obtain annual registration as workplace from DOHSS

Some popular Safety Slogans

- Safety starts with you
- Don't learn safety through an accident
- Protect your hands, you need them to pick up your pay check
- Safety - A small investment for a rich future
- 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

- THE END
- THANKYOU

SEMIs - UoN

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

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





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.



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.

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.



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.

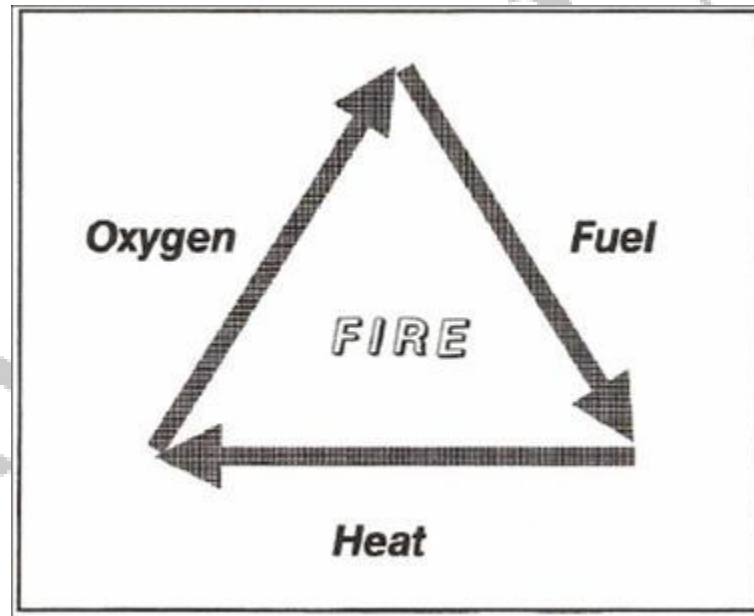
FIRE SAFETY

- 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



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

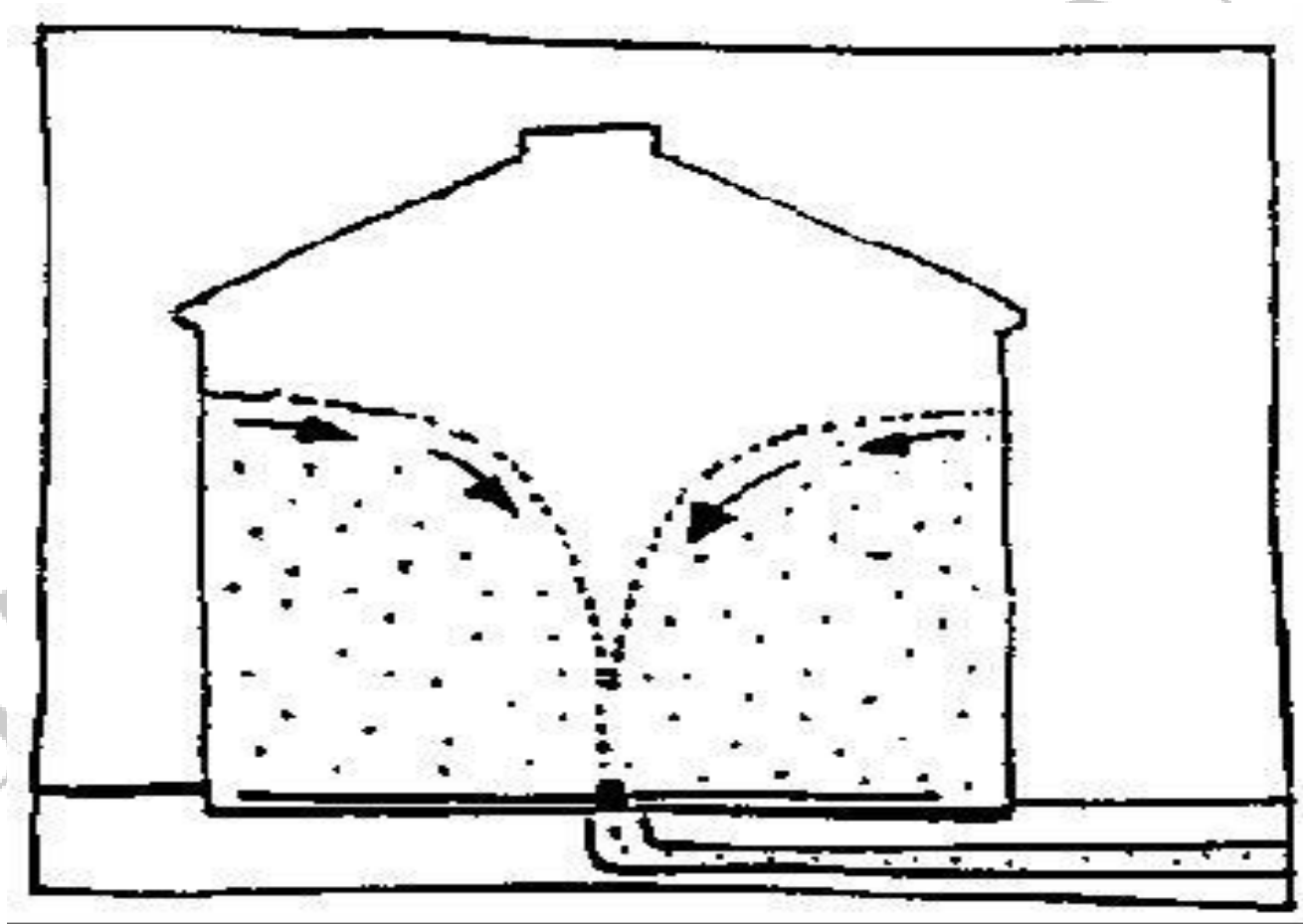
- Fire suppression requires the effective application of one or more methods of extinguishment,

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.

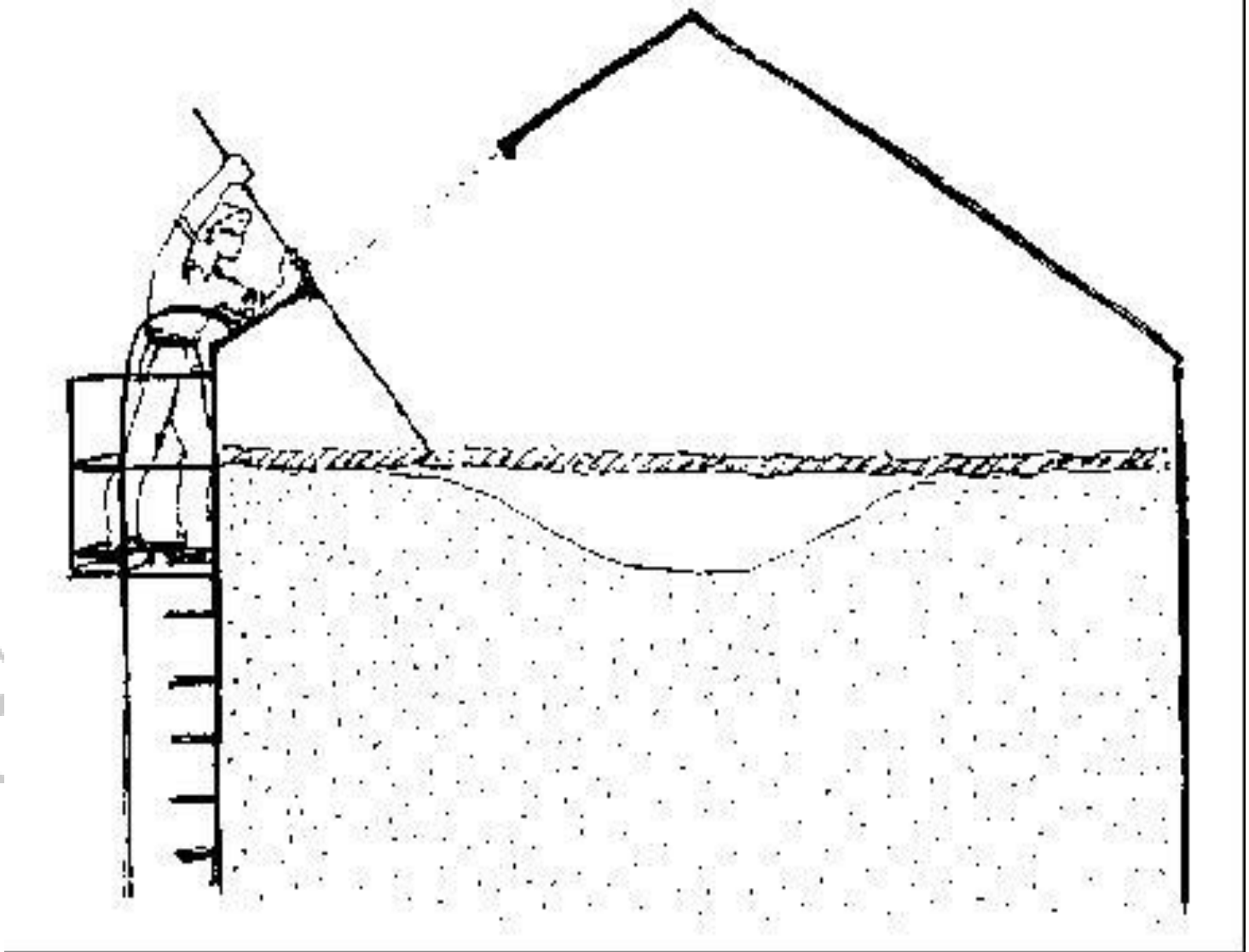


- The suffocation hazard can be eliminated by never entering grain-storage structure when it is being loaded or unloaded.
- The power to all conveying equipment, automatic and manual, should be shut off, locked, and tagged to prevent unexpected operation
- Consider installing a permanent ladder on the 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

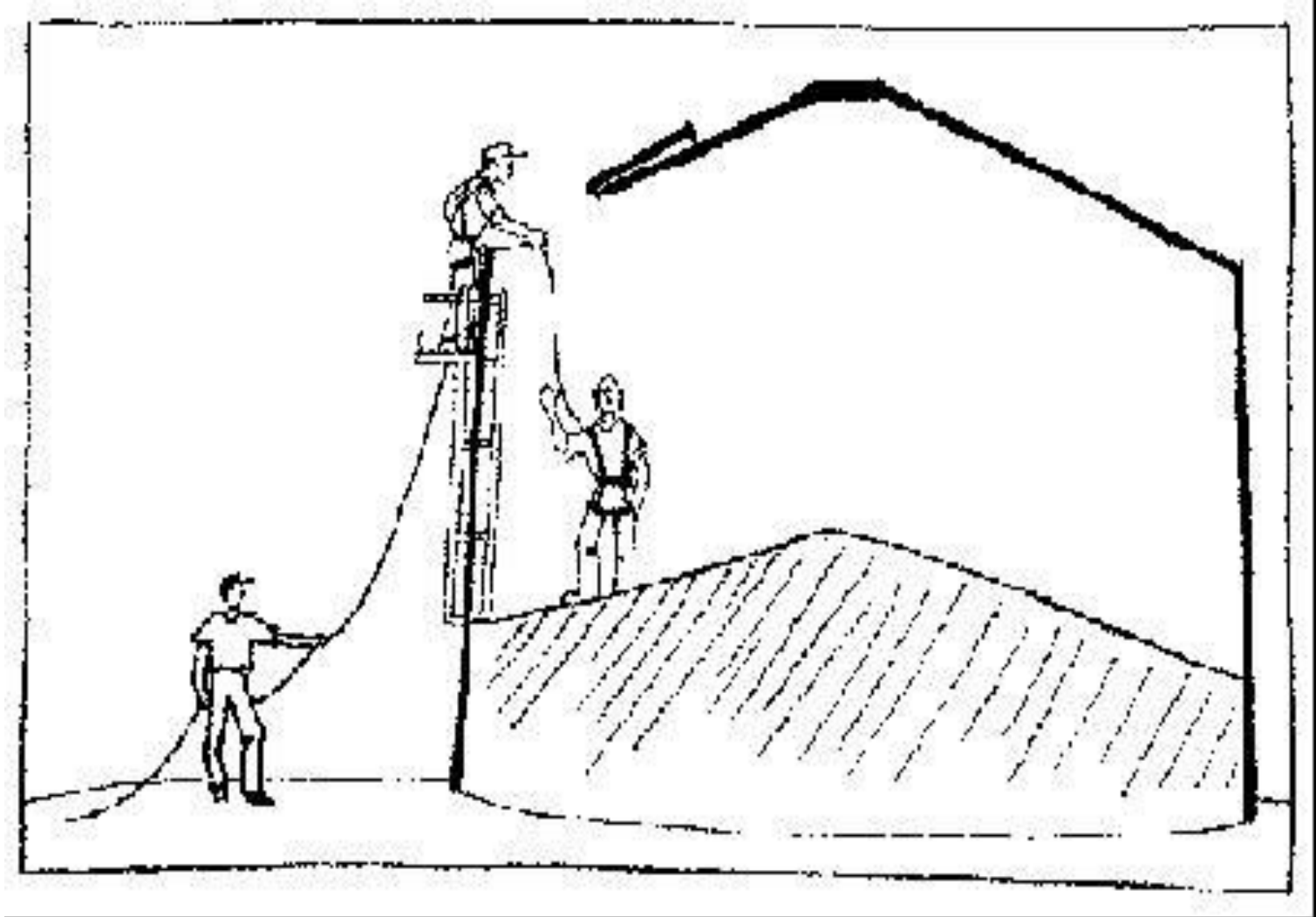
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- Frozen or crusted material sticking to walls can fall on someone trying to break this material loose, crushing or suffocating the worker.
- Workers should always remember that it takes very little grain to entrap and suffocate a person.
- Never enter 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.

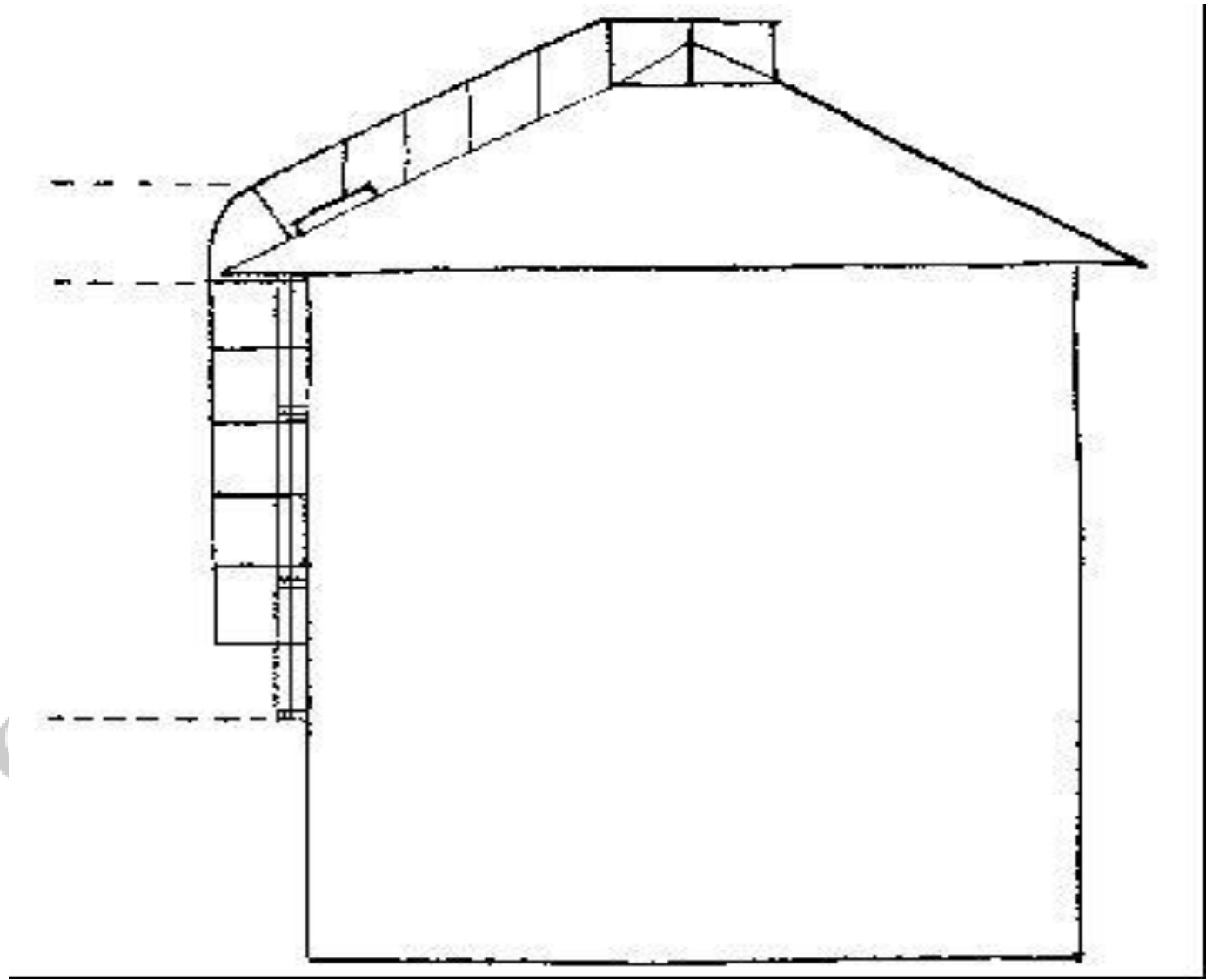
- A suffocation hazard also exists from the gases given off from spoiling grain.
- For example, the carbon dioxide (CO_2) given off is heavier than air and will collect above the grain surface.
- You cannot smell, see, or taste the CO_2 .
- If enough gas has collected to decrease the oxygen concentration 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_2 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.



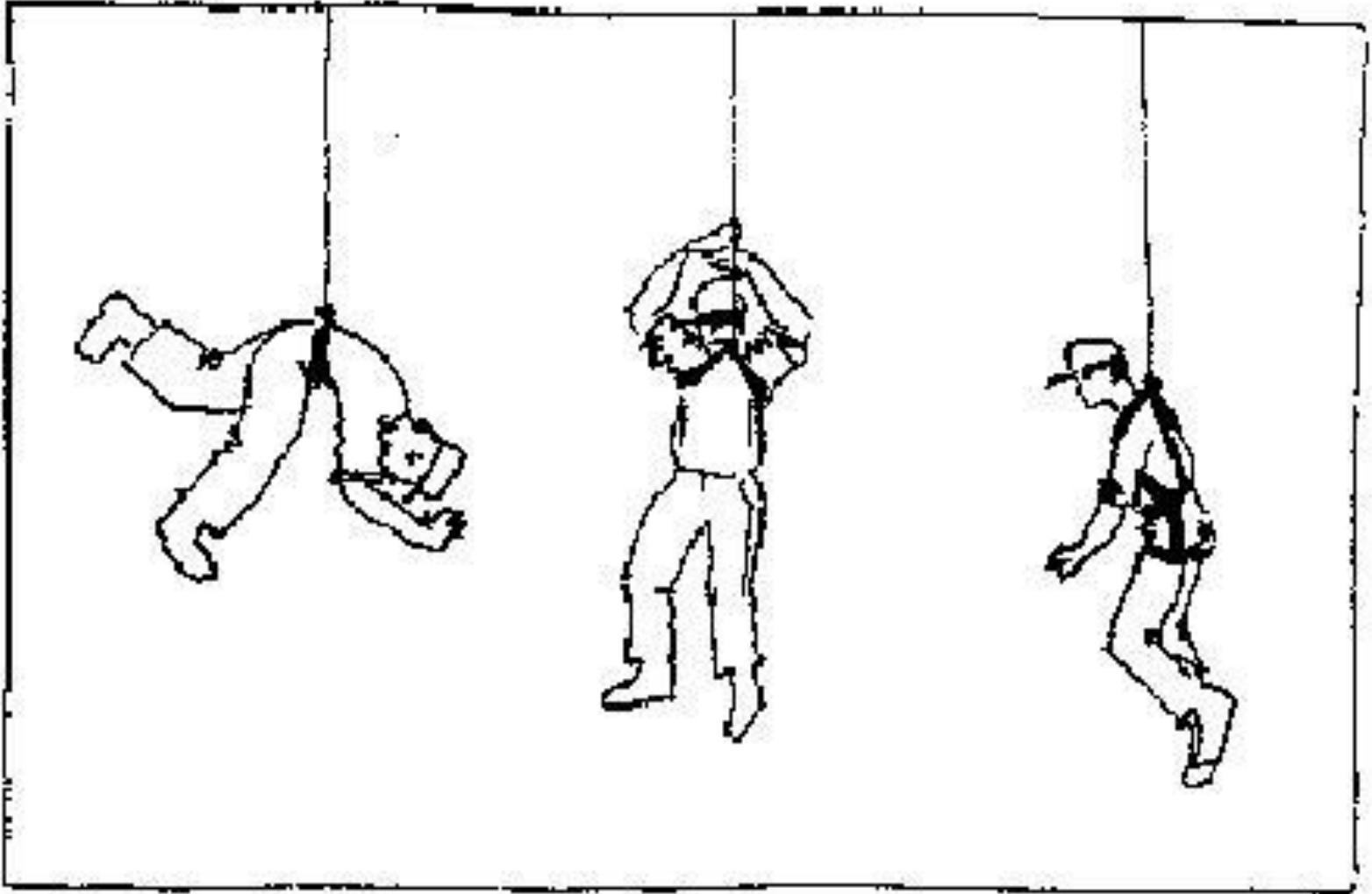
Falling hazards

- 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.



- 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).



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.

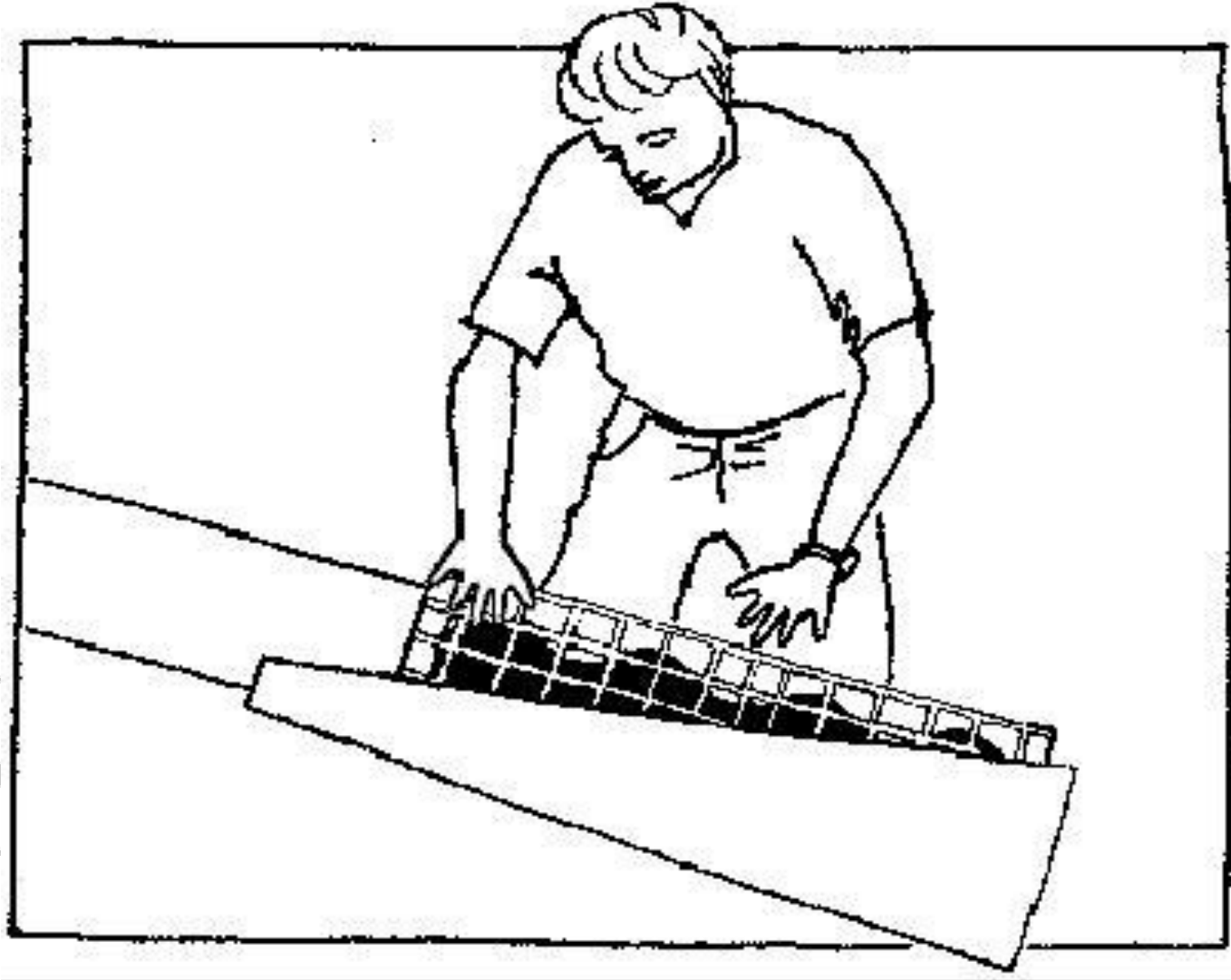
CONVEYING

- 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.

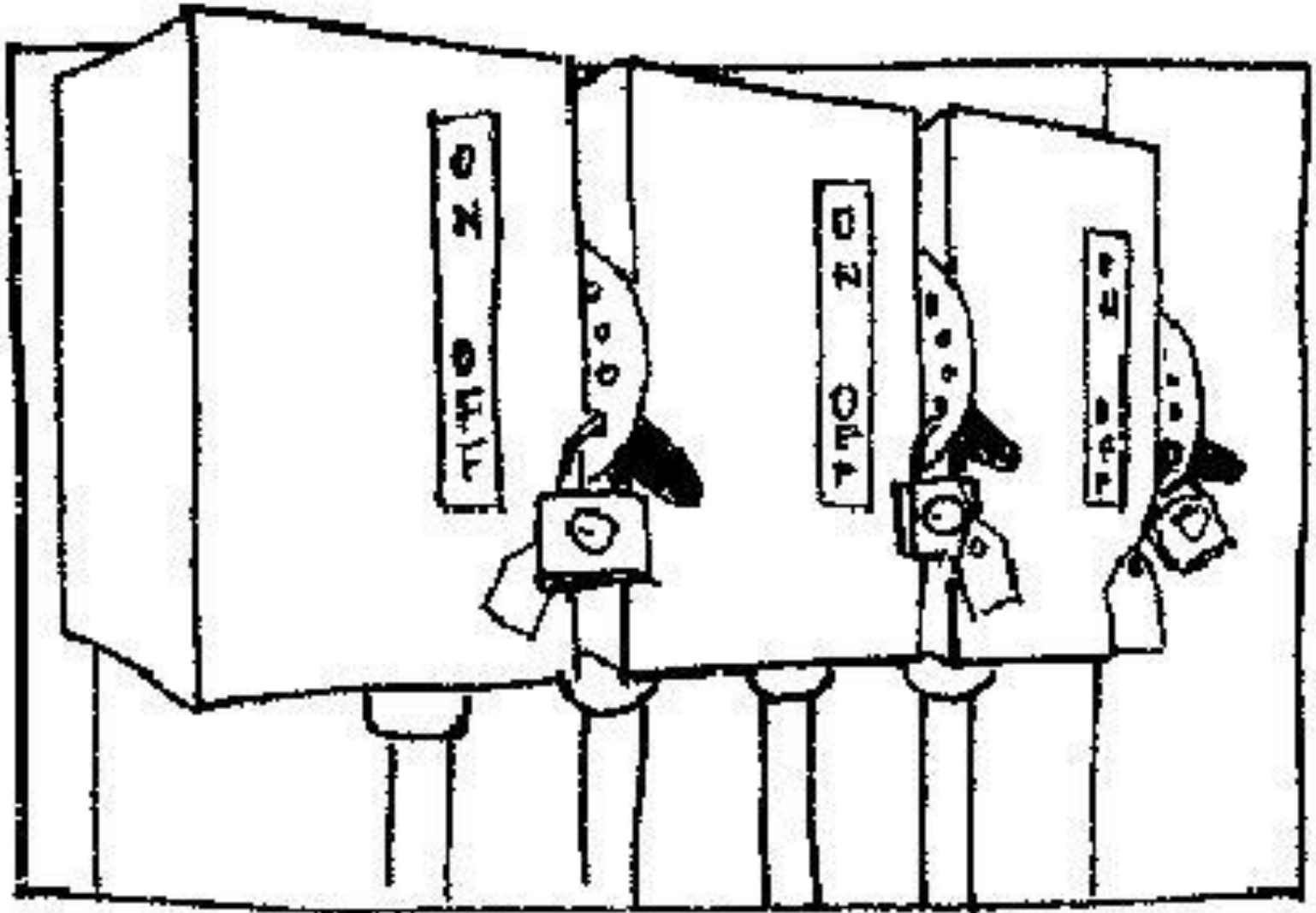
- Keep your hands and feet from the intake areas of augers and elevators.
- For example, don't level or redirect the flow of grain into the auger or elevator with your hands or feet.

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).



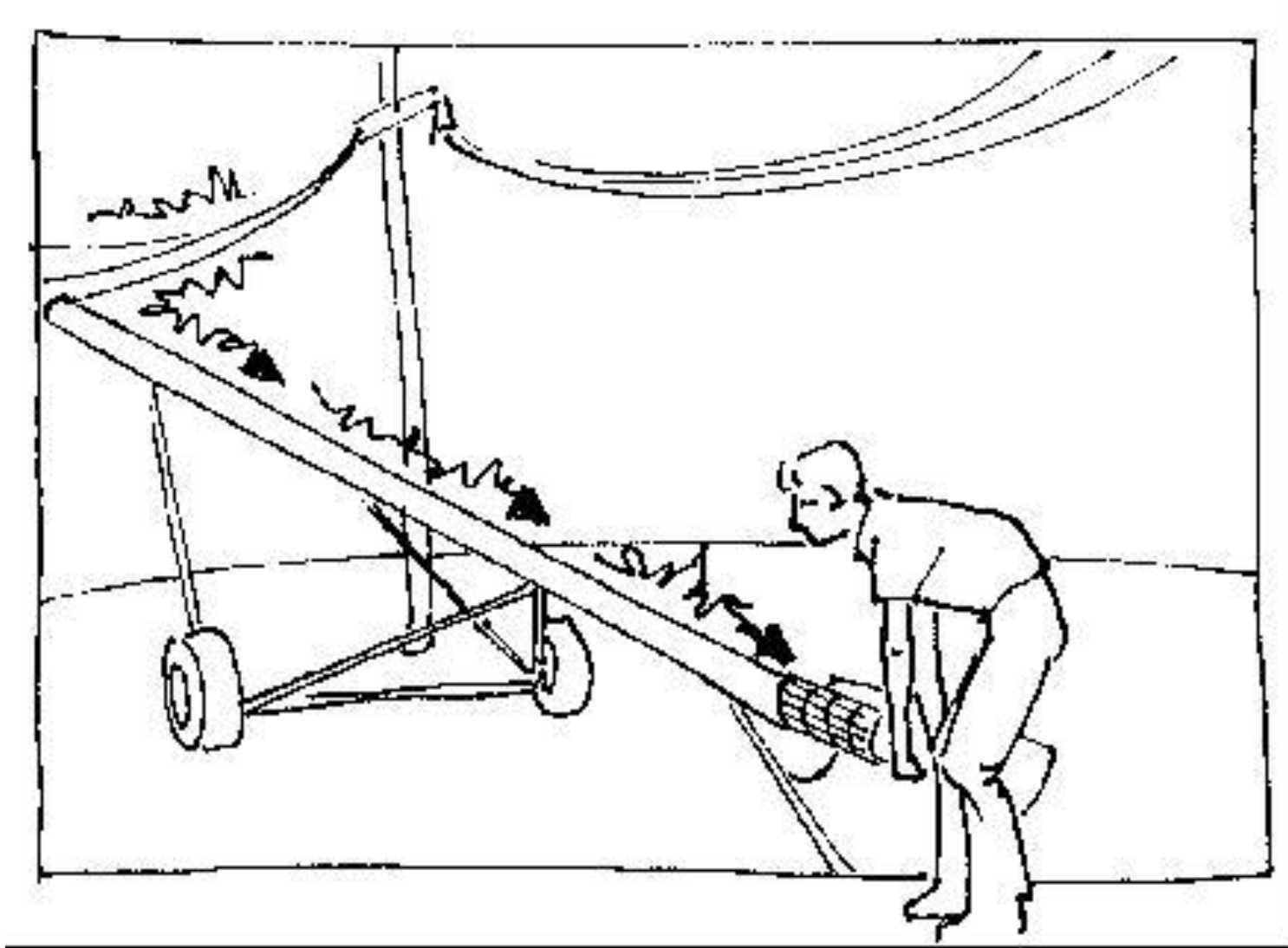
- Always shut off and lock the power to conveying equipment before servicing or unclogging it (Figure 10).
- If the equipment is driven by a power take-off (PTO), shut off the tractor and take the key;
- if it is electrically driven, turn off and lock the power.
- Don't take the chance that the equipment 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 VIOLATION MEASURES

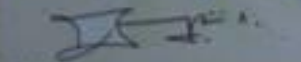
First Violation — Verbal Warning and Re-training

Second Violation — First Written Warning

Third Violation — Second Written Warning

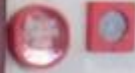
Fourth Violation — Termination

(Disregarding Safety)



FACTORY UNIT MANAGER

FIRE
EXIT













BREAK GLASS
FOR
KEY TO DOOR

0792
9X⁵/₈

1869









