

**LEARN
& LIVE**



Grain Handling Safety Coalition

A federal judge in East St. Louis, Ill., ruled... must pay \$179 million to three men burned in a 2010 grain elevator explosion in Chester, Ill.

A York man (21) has died after he was caught in a piece of grain-bin machinery on his family's farm...got caught in a sweep auger while getting grain out of a bin.

A review of Kansas grain elevator deaths ...7 men...killed by an explosion...21 workers were buried under grain, 5 others were crushed by equipment, 5 died in falls and 3 were electrocuted.

HAZELTON TOWNSHIP, MI — A farmer was killed after being buried under soybeans inside a silo during a farming accident. The

...A 31-year-old worker died in an apparent accident at the ... corn

A 69-year-old co-op worker died after a semitrailer truck backed into him at a southeast Nebraska grain elevator.

Overview – Grain Handling and Storage Safety

Worker dies in “oxygen-deficient” area at ... plant in Cedar Rapids, Iowa...

processing plant ...the man fell while working in a confined space at the plant.



Introduction

This Overview module is part of a curriculum series addressing hazards found in areas of grain handling facilities including grain bins and their surrounding area. It's purpose is to assist participants in identifying and abating hazards in the work place.



Disclaimers

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Learning Objectives

At the end of this module, participants will be able to:

- Identify the 6 major hazards associated with grain handling & storage.
- Describe effective abatement methods for the hazards to reduce risks of injury, illness or death.
- Understand the relationship of the OSHA Grain Standard to their work environments and safe work practices.



Module Topics

1. Understanding the Problem
2. Six Main Hazards of Grain Handling
3. Grain Standard
4. Risk Assessment
5. Learning Objectives Review
6. Summary





Understanding the Problem

Understanding the Problem



Problem Identification
Local Impact
Contributing Factors
Types of Hazards



Problem Identification



- Increase industry size = increase # of incidents.
 - Increased exposure.
- High hazard industry.
 - Types of risks present.



Local Impact

- Entrapments increased over 183% (2001- 2010).
- 2010 – 57 recorded entrapments (highest #).*
- 31 fatal engulfments in 2010.*
 - Illinois led the states – 10 entrapments.
- 12% of entrapments involve youth under 16.
- Historically, 70% occur on farms; 30% commercial
 - Gap is narrowing

Entrapment incidences continue to rise.



Local Impact Discussion



“Grain Bin Safety: Protecting Yourself and Your Family”



Contributing Factors

Work environment

- High injury risk

Complacency

- @ 11,000 OSHA regulated facilities
- @ 300, 000 OSHA exempt facilities

High % Small businesses

- Minimal training
- low understanding or appreciation of risk

Minimal Skills

- safety risk management



Contributing Factors – Increase Off-Farm Storage Capacity

Nationwide increase to 10.1 billion bushels in 2011. In 2012 10.2 billion).

Largest increase in IL – added 91 million bushels in 2011

Increased exposure to risk



Contributing Factors - Increase On-Farm Storage Capacity

On Farm storage increasing

12.8 Billion Bushels in 2011

13 Billion Bushels in 2012

Illinois = 1.46 Billion Bushels or 11.4%



Storage Hazards



- Engulfment
- Falls – ladders, other
- Entanglement

- Augers
- PTO shafts
- Gears
- Machinery/equipment

- Electrocution

- No LOTO
- Contact with overhead power lines



Storage Hazards



- Dust Explosions
 - Mostly commercial
 - Farms w/ large storage



- Rail car incidents
 - Commercial

- Exposure
 - Toxic dust
 - Fumigants
 - Noise



6 Major Grain Hazards



6 Major Grain Hazards

- Engulfment
- Falls
- Electric
- Entanglement
- Struck by
- Dust explosion
- Others
 - Respiratory dust exposure
 - Noise exposure



Engulfment/Entrapment



Engulfment/Entrapment

Grain bin entry exposes workers to **suffocation hazards** - Leading cause of fatalities.

Suffocation can occur from:

- Grain engulfment
- Hazardous atmospheres



Engulfment/Entrapment

Ways to become engulfed or entrapped:

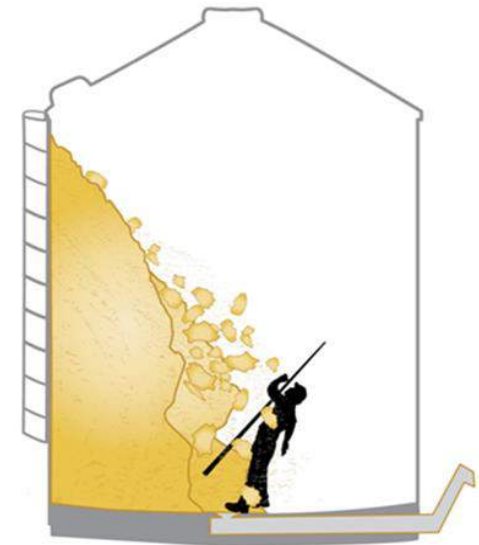
Flowing Grain



Bridging/Horizontal
Crust Collapse

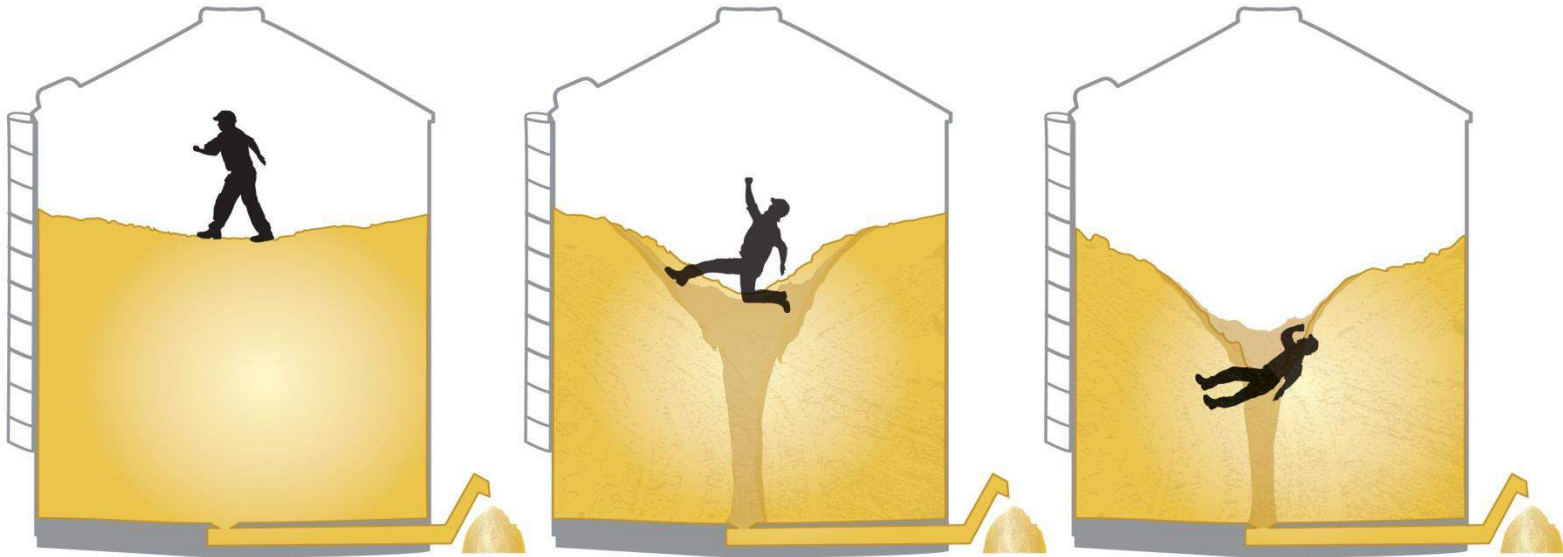


Avalanche/Vertical
Crust on Sides
Collapse



Flowing Grain

- Moving/flowing grain acts like “quicksand”
- Buries the worker in seconds.



From time auger starts, you have **2-3 seconds** to react.

In 4-5 seconds you are trapped!

In 22 seconds you are completely buried!



Grain Bin Engulfment/Entrapment Demonstration

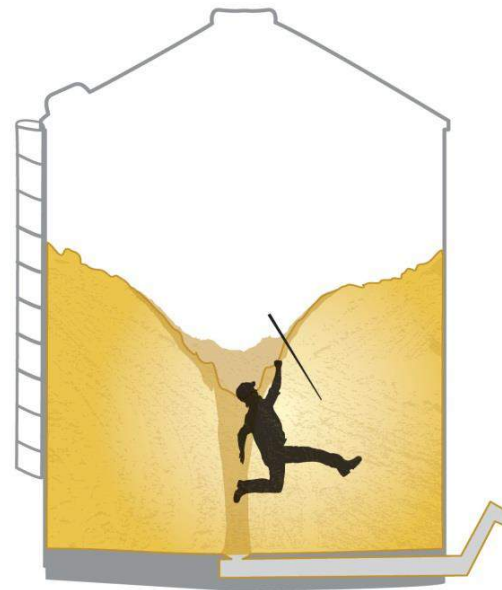
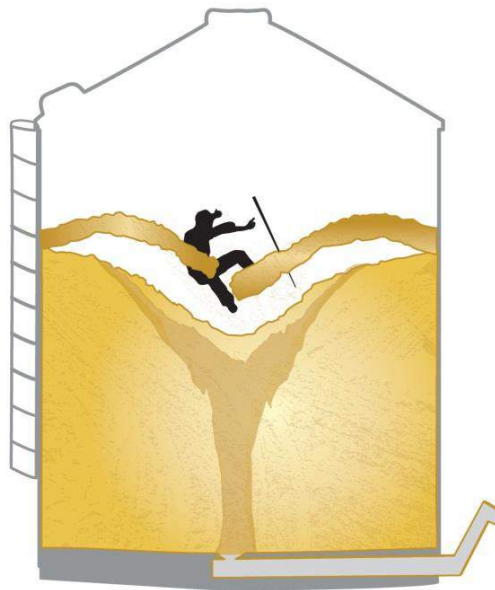
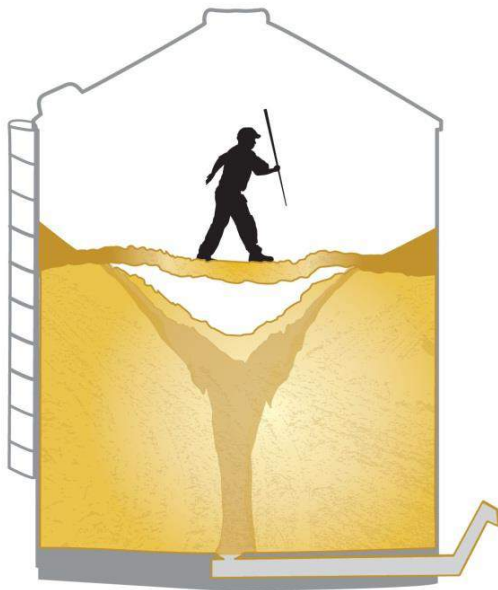


Purpose: to show participants the effects of flowing grain on a person in the grain bin.



Bridged or Crusted Grain

- “Bridging” occurs when grain flows over a worker’s head. Cavity created by previous partial unloading of grain – A dangerous situation.
- Bridged grain falls into airspace when unloading starts – traps worker instantly. Suffocation occurs in seconds.

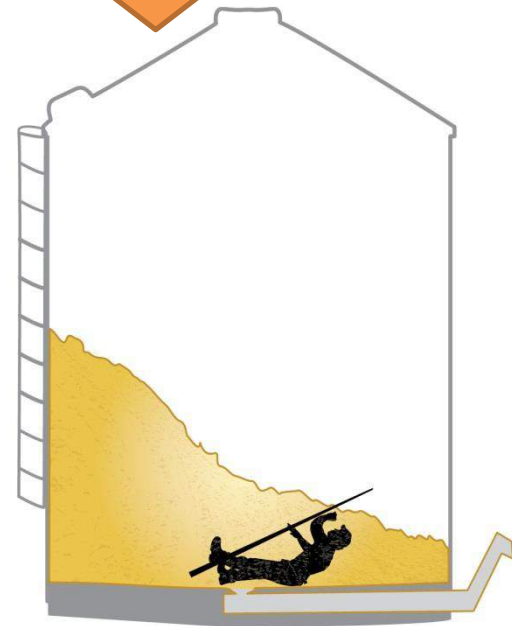
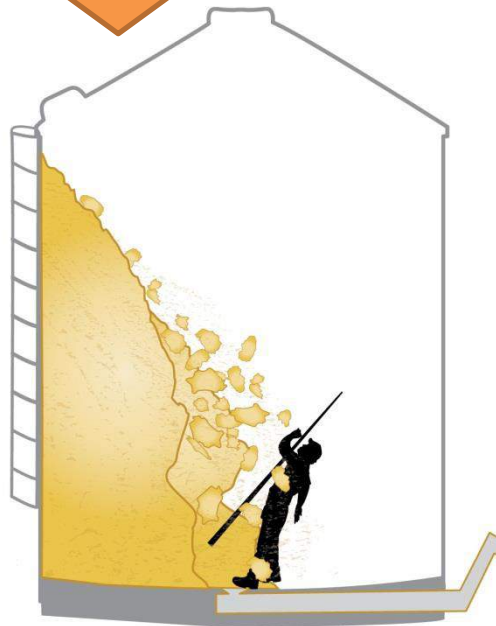
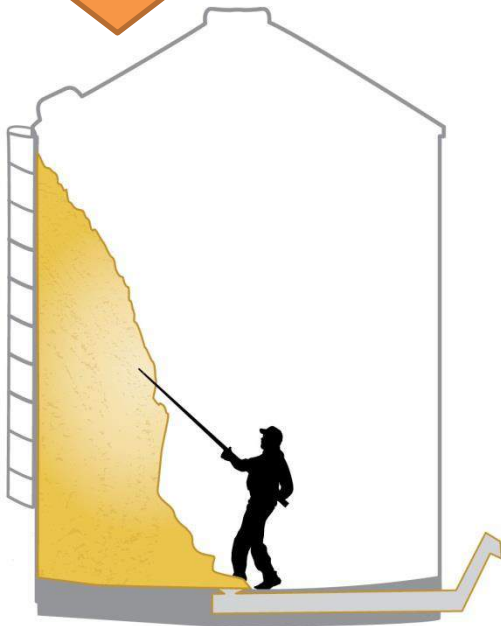


Avalanching Grain

BEWARE – Never work underneath a steep pile of grain.

A few feet of grain has enough force to knock a worker down & make him helpless to free himself.

Grain will bury & suffocate a worker in seconds.



Fall Hazards

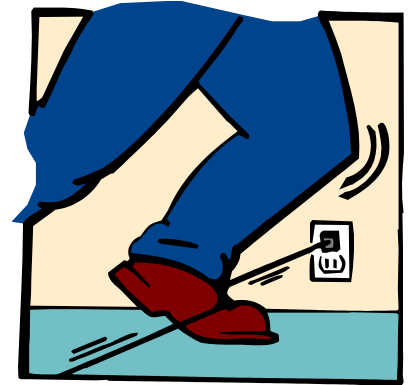


Fall Hazards

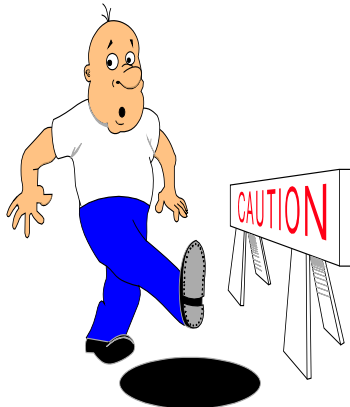


Slips, Trips, and Falls

- Same Level – Most Common



- Elevation – From one level to the next



Ladder Safety

Step Ladder

Spreaders & Shelf – fully extended and locked

Level support for all 4 side rails

Base – full spread open.

Extension Ladder

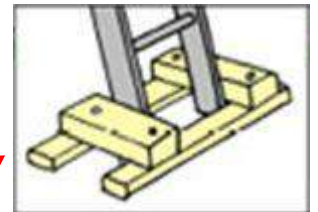
Extends 3 ft above surface

Tied off at top

Minimum 3 ft overlap

4:1 ratio or 75.5° Angle:
For every 4 ft of height, place 1 ft away from base.

Secured at bottom;
stable surface



Ladder Safety – Don't



Top step, 2 people,
uneven surface



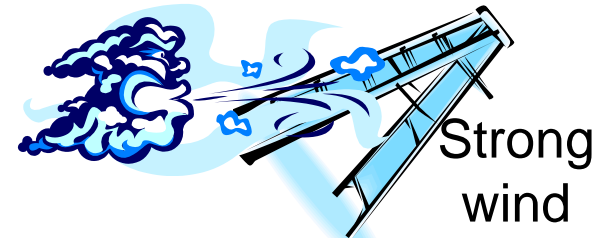
2 ladders
tied
together



Improper
use



Broken
ladder



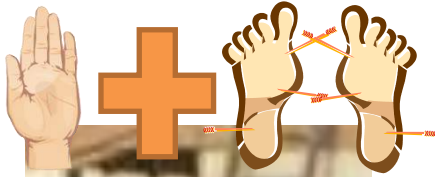
Strong
wind



Steps at
side of
work task



Ladder Safety – Incorrect Use



Wrong
way



- 3 point contact
- Hands free (tools in belt)
- Facing job task
- Centered between rails
- Below top rungs
- Non-slip shoes

Climbing
on Braces



Carrying
Materials



Over reach



Fall Protection



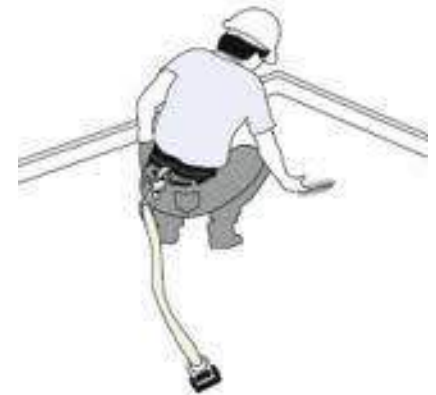
- Planned system.
- Protects worker if loses balance while performing a task at height.
- Controls, reduces or eliminates death or injury.



Fall Protection Systems

Two Types of Fall Protection Systems

- Fall Restraint System
 - Prevents fall from occurring
- Fall Arrest System
 - Prevents free fall



A fall-restraint system



Fall Protection Systems

Fall Restraint System



- Allows worker to approach fall hazard & work.
- Restrains worker & prevents fall to a lower level.
- Person cannot reach or fall over the edge.
- May be a structural design.
 - Guardrails
 - Aerial lift with work platform
- May include harness and restraint cable.



Fall Protection Systems

Fall Restraint Systems



Restraint Cable



Structural Restraint



Fall Protection Systems

Fall Arrest System



- Stops (arrests) a free fall.
- Protects person from crashing onto a lower level.
- Use when worker is at risk of falling from height.
- Only use when:
 - Work cannot be completed in another way.
 - Other fall prevention means cannot be used or is not feasible.



A

**Anchorage/
Anchorage Connector**

Referred to as Anchor
Point or Tie Off Point

B

**Body
Harness**

C

**Connecting
Device**

Joins body
harness to anchor

Fall Protection

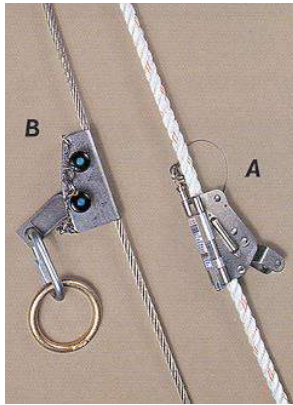
Fall Arrest System

- Components include:
 - An anchorage point
 - Body harness
 - Connectors – lanyards, rope grabs, anchorage connectors
 - Deceleration devices –



Common Components of Fall Prevention Equipment

Rope & Cable Grabs



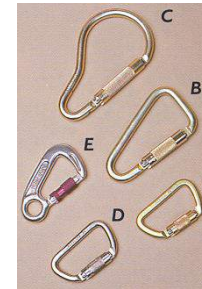
Auto Locking Retractable Lifelines



“Y” Shock Absorbing Lanyard



Carabineers



Full Body Harness



Electrical Hazards

The difference between near electrocution
and actual electrocution.



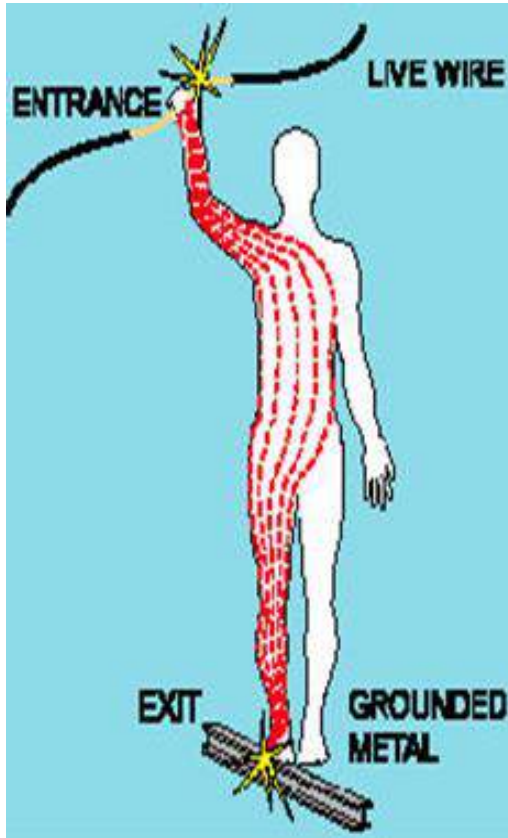
Electrical Hazards

- Electrocution
- Explosions
 - Electricity provides a source of ignition
- Fires - caused by:
 - Overloading circuits
 - Excessive current flowing



Electrical Hazards

Electric shock/electrocution



- Current flows through body & causes damage.
- Severity of shock:
 - Amount of current
 - Path of current
 - Duration
- Cause burns & falls.
- Burns – thermal & electrical

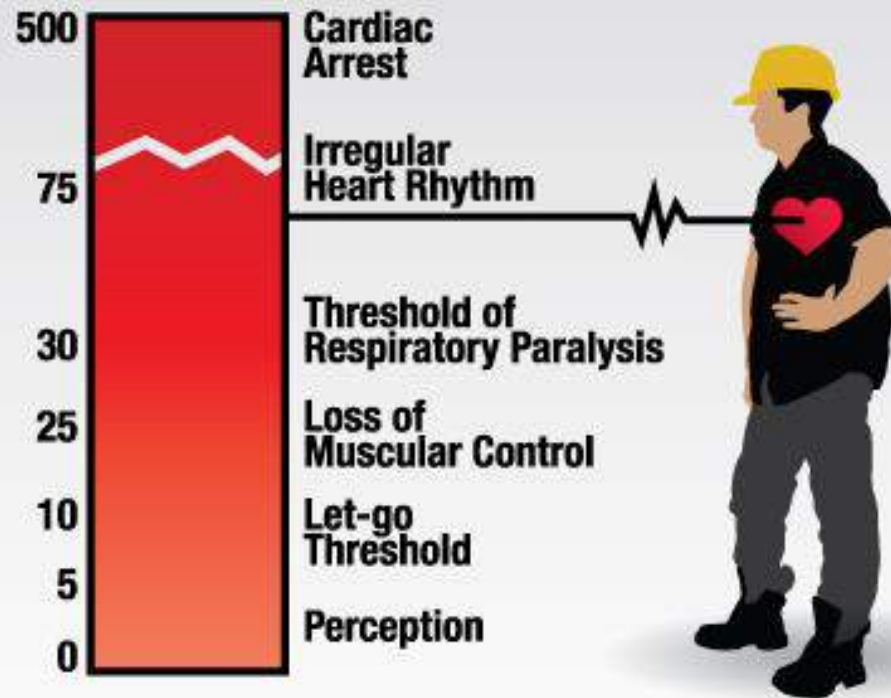


Electrical Hazards

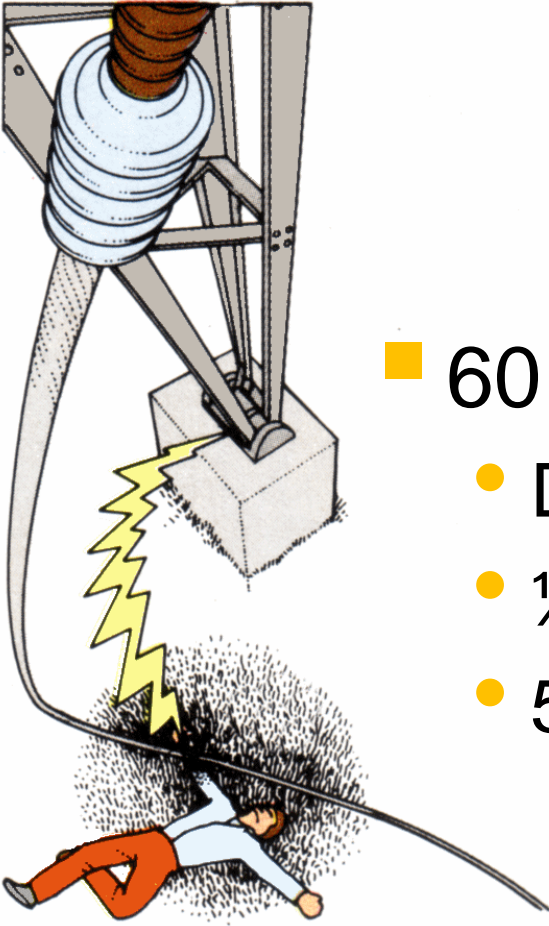
Effects of Electric Current on the Human Body

Milliamperes

1 milliampere = 1/1,000th of an amp



Electrical Hazards



- 60 watt lightbulb
 - Draws $\frac{1}{2}$ amp
 - $\frac{1}{2}$ amp = 500 milliamperes
 - 500 milliamperes can result in death

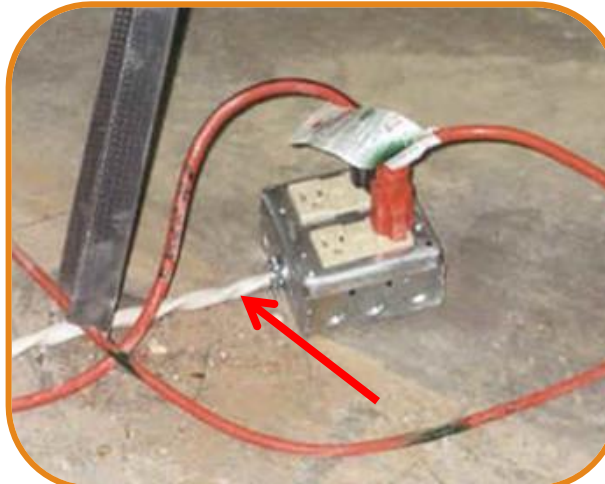


Electrical Hazards



Faulty Equipment

- bad splices, sharp edges, bare conductors



Improper Use & Installation

- Listing & Label not followed



Insulation Integrity

- Free from short circuits



Electrical Hazards

Arcing Parts



- Cause arc, spark, flame.
- Enclose parts.
- Separate & isolate from combustible materials.

Deteriorating Agents



- Wet or damp location.
- Exposure to chemicals, acids, excessive temperatures.

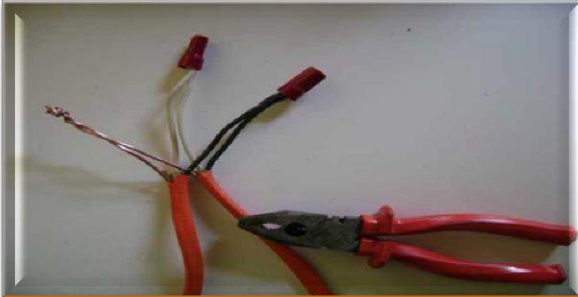
Mechanical Execution



- Sloppy workmanship.
- Not neat, organized, labeled.



Electrical Hazards



Splices

- Before soldering, join mechanically and ensure electrically secure.

Unplugged Openings & Boxes

- Dust build-up.
- Rodents, etc get inside –chew, nest.



Not Identifying & Labeling

- Disconnecting means, circuits, feeders.
- Illegibly marked or not marked.



Electrical Hazards & LOTO

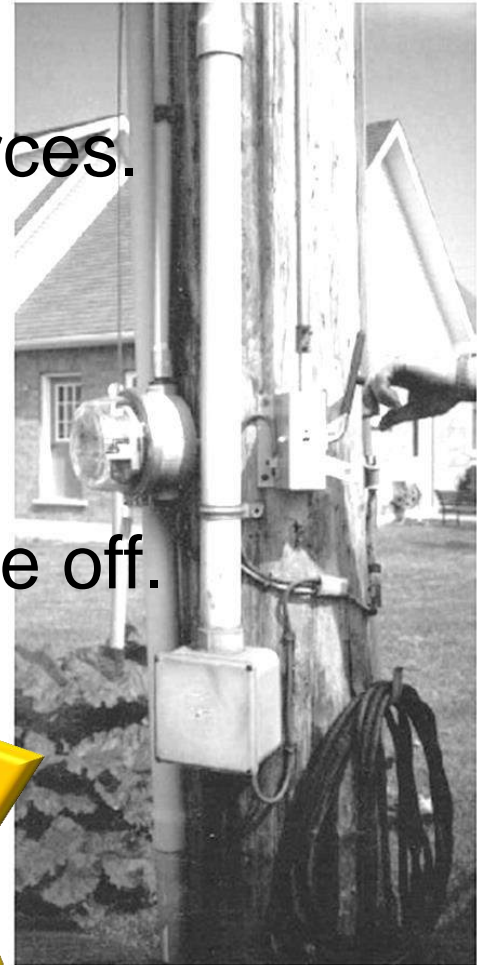
Lock Out/Tag Out

- Before any maintenance or servicing.
- Prevents unexpected start-up.
- Electrical/other equipment:
 - Capable of accepting lock.
 - Lock in open position the disconnecting means of the energy source.



Lock Out/Tag Out

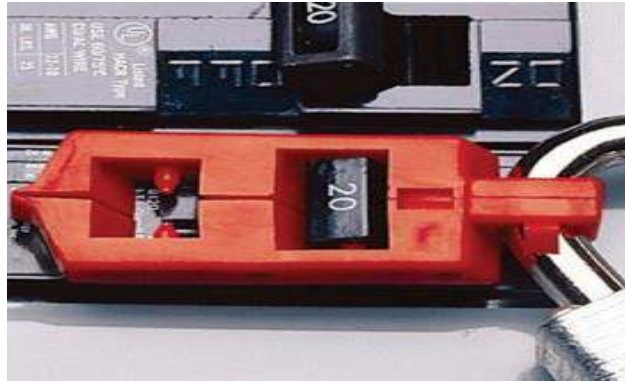
- **De-energize** (shut off) all energy sources.
- **Lock out** energy source.
- **Tag Out** – Identify who locked energy source.
- **Try Out** - ensure all power sources are off.



Various Electrical Control Locks



Pole Breaker Lockout



Breaker Lockout



Outlet &
Cord
Lockout

Padlock



Lockout Hasp



Wall Switch
Lockout

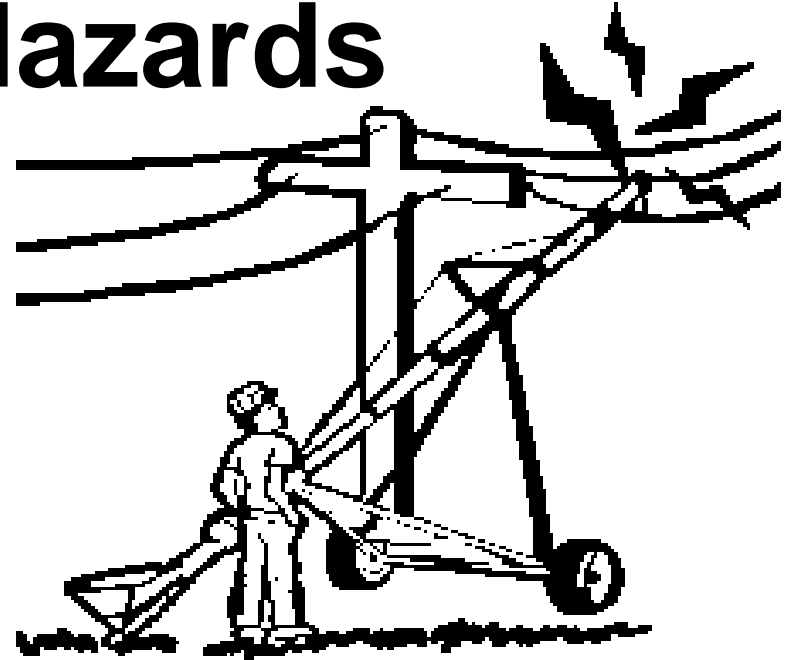


Electrical Hazards

Grain Auger Near Power Line



Electrical Hazards



Power Lines & Transportation

- Always lower & secure augers before transporting.
- Check for overhead power lines.
- If contact is made or power line broken:
 - Remain on the tractor
 - Call 911 & the power company (if known) immediately.



Electrical Hazards



Overhead Power Lines

- Avoid working by lines.
- Shut off power when working near them.
- Metal ladders must be grounded.
- Be aware of long tools that could come in contact with the line.



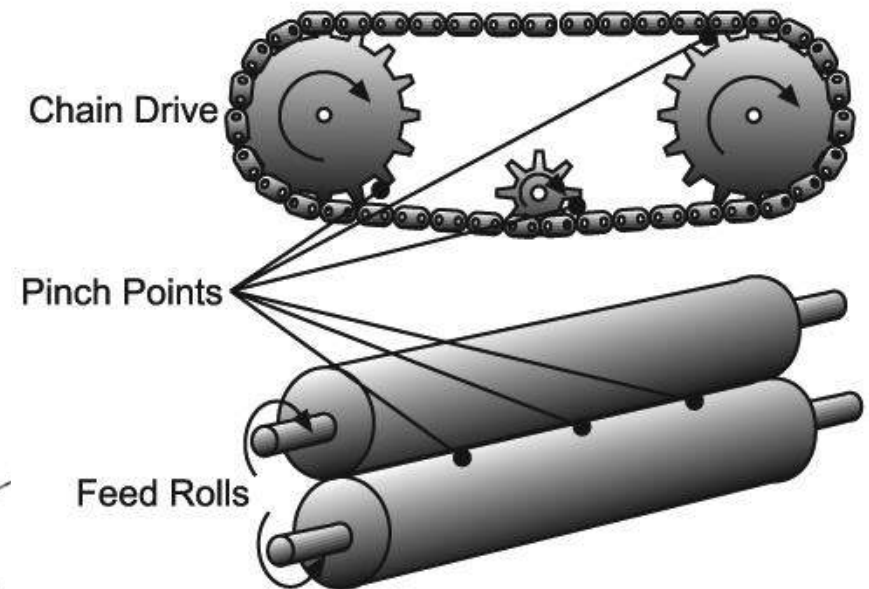
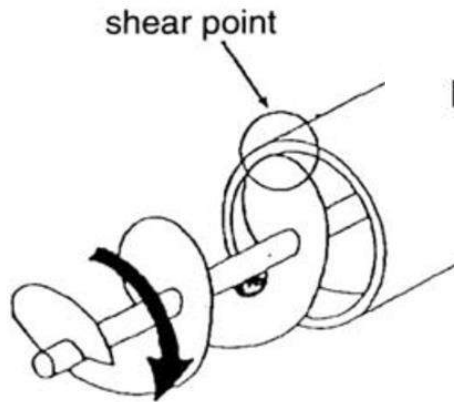
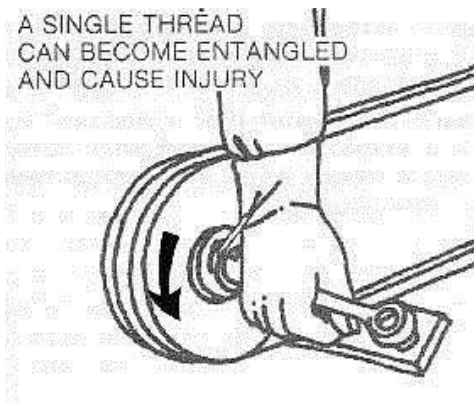
Entanglement Hazards



Entanglement Hazards

Common Machine Hazards

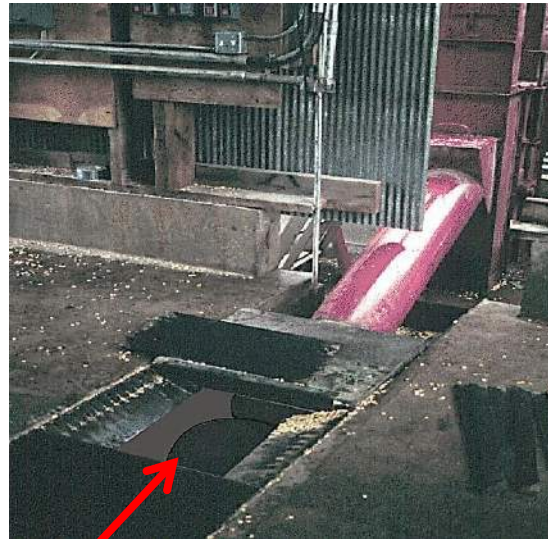
- Pinch Points
- Wrap Points
- Pull-in Points
- Shear/Cutting Points



Entanglement Hazards

- Guard ALL exposed moving parts including augers.
- Use LOTO.

**Best
Practice
for All!**



Guarded Part

Unguarded parts



Entanglement Hazards

Operating Equipment

- Review Operators Manual.
- Wear tight fitting clothing.
- Guards & shields **ALWAYS** in place.
- Never step over operating PTO.
- Keep children away from operating equipment.



Entanglement Hazards



- You do NOT have time to react!

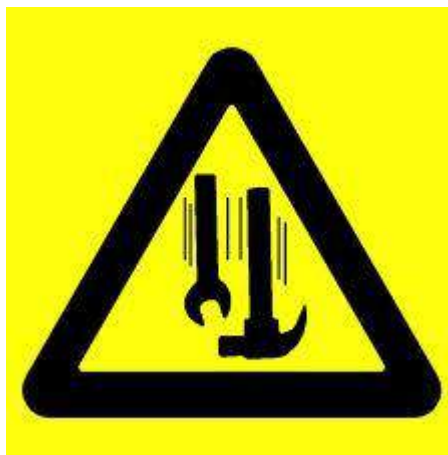
- Takes $\frac{3}{4}$ second to react.
- 540 RPM pulls a person's body over 5.25 ft in $\frac{3}{4}$ second.



PTO Demonstration



Struck By Injuries



Struck By Injuries

Vehicles

Never stand, sit, play

- Near
- Under
- Behind

a raised grain truck
or other vehicles.

Machinery

- Machinery can throw objects or fuel
- Residual energy & movement



Falling Objects

- Secure overhead objects.
- Transport tools in secure manner.
- Post warning signs.
- Wear hard hats
 - Reduce severity of injury from falling objects



Dust Explosions



Dust Explosions



Past 35 years:

- 503 grain elevator explosions
- 677 injuries
- 184 deaths

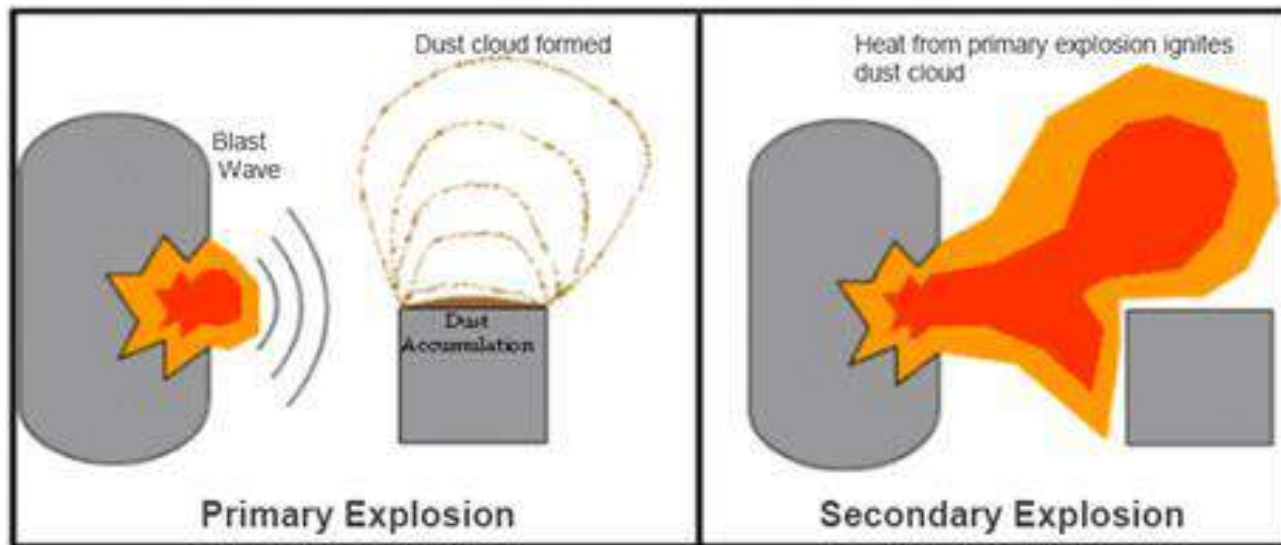


Dust Explosion Demonstration



Dust Explosions

- Combustible dust is suspended in air and ignited.
- Cause very rapid burning, release of gaseous products and subsequent pressure rise.



Dust Explosions

Explosion Safeguards

- Fire prevention & protection
- Dust Control
- Engineering Controls
- Maintenance
- Housekeeping
- Training

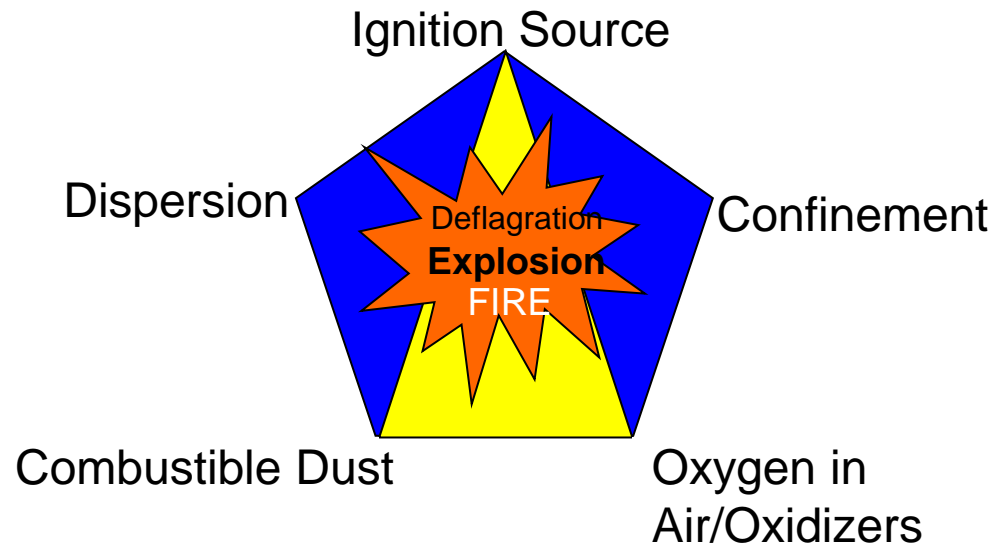


Dust Explosions

Explosion Pentagon

Prevention & Protection

- Policies, practices, procedures.
- Control fire elements.
- Keep them apart.



Dust Explosions



Dust Control

- Less than 1/8" dust
- Dust control systems.
 - Filters
 - Cyclone collector.
- Wash down procedures.
 - Hoses & water used to remove accumulated dust.
- Sweep on a regular basis.



Dust Explosions

Engineering Controls

- Limit/control potential ignition sources
- Follow applicable NFPA standards
- Monitor temperature & vibration
- Electrical in area is explosion proof (Class II).

Perform Maintenance

- Scheduled
- Lubricate bearings
- Belts, motors
- Change filter Bags



Dust Explosions

Housekeeping

Clean dust collection system & holding bins.

Wash down & sweep.

Scheduled

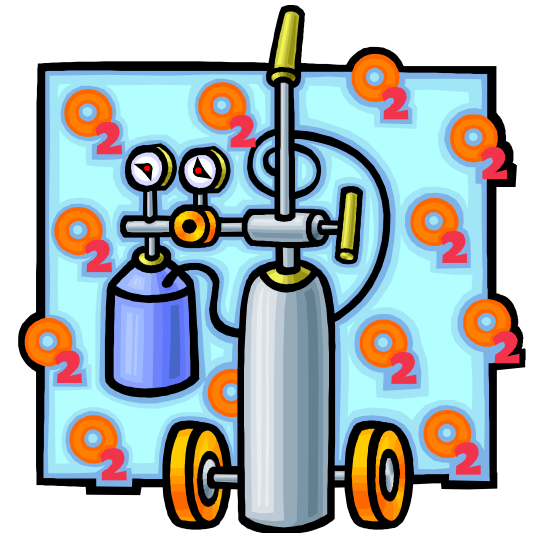
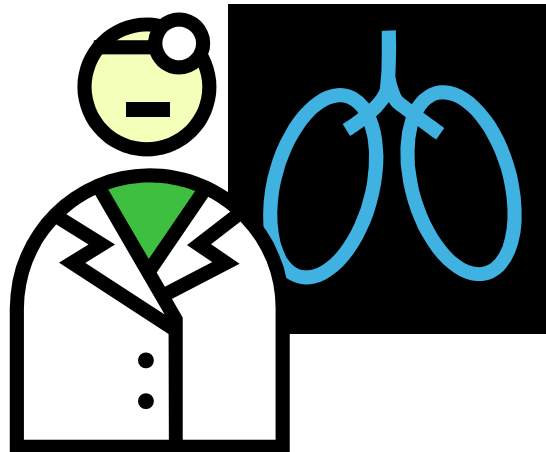
Training

Establish safe work practices.

Hazard recognition training.

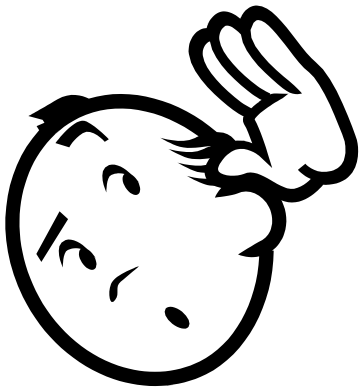
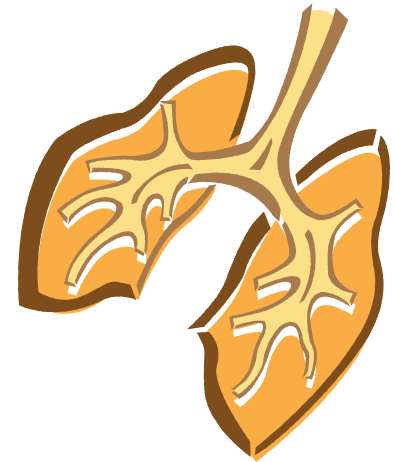


Health Risks



Health Risks

- Dust exposure
 - Acute and chronic lung problems.
- Noise Exposure
 - Occupational hearing loss





OSHA Standards & Best Practices

OSHA Regulations & Best Practices

- Overview of Regulations
- General Industry
- Agriculture
- Youth and Grain
- Grain Industry



OSHA Regulations - Overview

- General Industries Standards - 1910
- Special Industries
 - Agriculture Industry – CFR 1928
 - Grain Industry – CFR 1910.272
- Minimum safety requirements
- Enforcement – Adhere to applicable standard
- Does not cover wages, hazardous occupation orders (youth), hours, etc.
 - Fair Labor Standards Act – Wage and Hour Division



OSHA Regulations

1910 General Industry

- Lockout/Tagout
- Machinery & Machine Guarding
- Welding, Cutting, Brazing
- Permit Required Confined Space
- Personal Protective Equipment
- Walking-Working Surfaces
- Occupational Noise Exposure
- More



OSHA Regulations

1928 Agriculture

- Rollover Protection
- Agriculture Equipment
- Guarding
- Field Sanitation
- Hazard Communication
- DOT markings
- Occupational Health
- More



OSHA Regulations - Farms

11+ Employees

- General Industry & Agriculture Standards
 - On-site storage
 - Other
- Enforcement
 - Investigations
 - Citations & penalties
- Immediate family members exempt



OSHA Regulations - Farms



≤ 10 Employees

- General Industry & Agriculture Standards
 - On-site storage
 - Other
- Enforcement
 - Exempt from citations & penalties under Appropriation Bill
- Immediate family members exempt





Youth & Grain



Determine appropriateness of youth working with grain:

- US Dept of Labor Wage and Hour Hazardous Occupations Orders for Youth
- NAGCAT – North American Guidelines for Children's Agricultural Tasks
- GHSC Youth Position Statement



Youth & Grain

GHSC Position Statement:

- Youth under 18
- Properly trained by experienced & knowledgeable adult for all tasks.
- Not work in bins, silos, in/around flat storage unless they are empty.
- Ladder Safety – climbing with 3 points of contact; fall protection.
- Not inside places where grain is being moved.



OSHA Regulations – Grain

1910.272 Grain Handling

- All grain handling facilities
 - Except seed plants
 - Generally cannot be enforced on farms
- 1910 General Industries still applies
- Specific grain hazards, 272 takes precedence
- Written mainly for fire and explosion hazards
- Is not a “vertical standard”



OSHA Regulations – Grain

1910.272

General Training

- Annually or change in job assignment
- Topics:
 - General safety precautions
 - Dust accumulations
 - Ignition sources & smoking
 - Permit required spaces

Specific Training

- Same
- Topics:
 - Bin Entry
 - LOTO
 - Housekeeping
 - Maintenance
 - Grinding Equipment Cleaning Procedures
 - Leg Choke
 - Hot Work
 - Fumigation
 - MORE



OSHA Regulations - Grain

Issued by
employer

**Bin Entry
Permit**

Lock-
Out/Tag-
Out

Test
oxygen
levels

Test for
gases,
vapors,
and toxic
agents.



OSHA Regulations - Grain

Bin Entry

- Top Entry – harness & lifeline
 - Alternative when not feasible
- 2+ people present
- Entrant - Trained
- Observer - Trained
 - Rescue Procedures
 - How to call for help
 - Constant sight/communication with entrant
- Rescue equipment available



OSHA Regulations - Grain

Inform Contractors of:



*Potential
Hazards*

Applicable
Safety Rules

Emergency
Action Plan



OSHA Regulations - Grain

Grain Dryers

- Automatic controls
- Shut off fuel
 - Power failure
 - Interruption of movement
- Stop flow of fuel if excessive temperatures occur



Best Practices

Follow OSHA
Regulations –
Minimal Safety

Proper
Housekeeping

Preventive
Maintenance

Annual
Employee
Training

Bin Entry –
2 People
ALWAYS

Youth – HOs &
NAGCAT
Guidelines

LOTO

SAFETY
FIRST
ALWAYS!

Farm &
Commercial
Establish Safe
Practices



Group Exercise

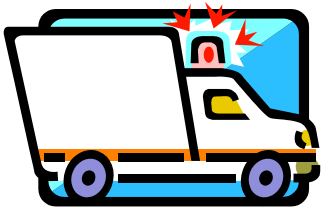




Safety Risk Management Principles

Safety Risk Management Principles

- Safety Risk Management
- Emergency Pre-Planning



Emergency

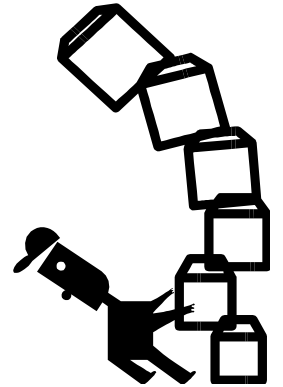


Safety Risk Management Principles

- Understand Risk
- Risk Management
 - Program
 - Hazard (Risk) Assessment
 - Reduce Risk
- Costs of Risk

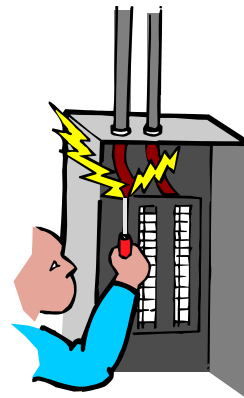


Understand Risk



Risk:

- How likely harm from a particular hazard will occur.
- Reality of the industry.
- Can be identified and managed.



Risk Management



Strategies, techniques, & systems put in place to identify and reduce risk.



Risk Management

4 Elements of an Effective Program

- Management commitment & employee involvement
- Worksite hazard risk assessment
- Hazard prevention & control
- Safety & health training



Hazard (Risk) Assessment

A process to:

- Identify hazards in the workplace
- Assess risks to health and safety
- Identify & implement measures to eliminate or reduce the risks.



Hazard (Risk) Assessment

Assess Risk

Frequency

How often
worker is
exposed to
risk



Severity

How serious
is potential
injury



Risk

Exposure - The opportunity to become injured or contract a disease.



Hazard Risk Assessment

HAZARD RISK ASSESSMENT MATRIX

Frequency of Occurrence	Hazard Categories			
	1 Catastrophic	2 Critical	3 Serious	4 Minor
(A) Frequent	1A	2A	3A	4A
(B) Probable	1B	2B	3B	4B
(C) Occasional	1C	2C	3C	4C
(D) Remote	1D	2D	3D	4D
(E) Improbable	1E	2E	3E	4E



Unacceptable



High



Medium



Low



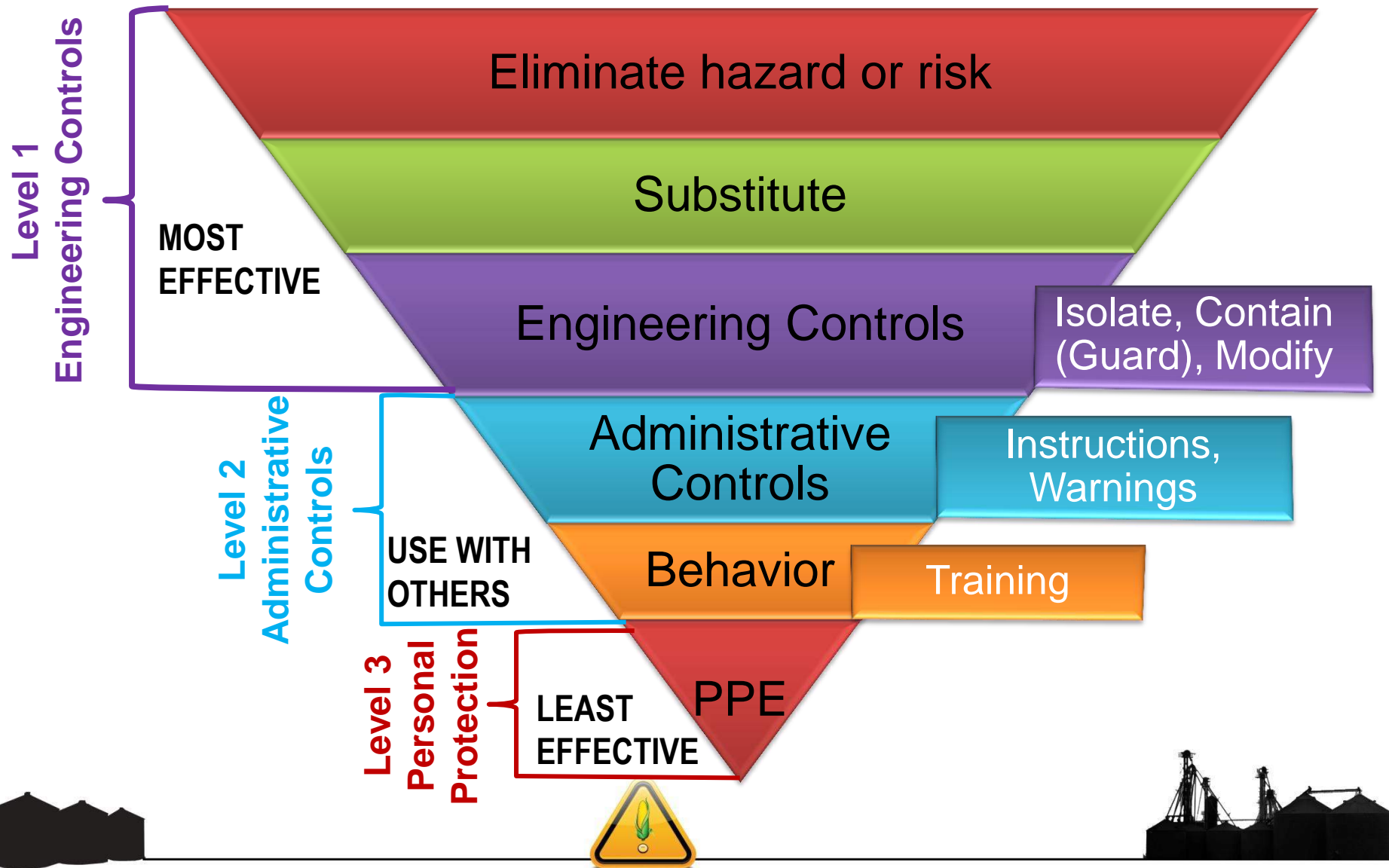
Reduce Risk

Steps to reduce risk

1. Use Safety Hierarchy
 - Identify types of controls & strategies to reduce risk/hazards.
2. Rank effectiveness of different strategies.
3. Choose controls/ strategies to use.
4. Implement controls/strategies.



Reduce Risk - Safety Hierarchy



Reduce Risk – Effectiveness

Level 1 – Engineering Controls

- MOST Effective
- First Choice
- Best Strategy – Eliminate hazard
 - OR prevent creation of hazard
- Others:
 - Substitute (less dangerous, toxic, etc)
 - Modify/redesign equipment or work process
 - Isolate, contain, separate – (includes guards)
 - Reduce (Example: Dust levels)



Reduce Risk – Effectiveness

Level 2 – Administrative Controls

- Low Effectiveness
- More effective with other controls.
- Requires more effort & dollars to maintain/sustain.
- Examples:
 - Warnings – systems, signs, barriers, labels
 - Policy & procedures – Safe work practices; planning processes; work process such as job rotation.
 - Maintenance Systems
 - Training; Communications



Reduce Risk – Effectiveness

Level 3 – Personal Protective Equipment

- Least Effective when used by itself.
- Last resort strategy.
- Provide PPE & keep in easily accessible location.
- Requires consistent training & reinforcement.
- Includes (not limited to):
 - Hearing, vision, skin, respiratory protection
 - Fall protection
 - Other



Reduce Risk – Examples

Eliminate

Manage grain quality to prevent entry

Substitute

Use less toxic chemical

Separate

Time/Space (machine controls away from hazard) or Barrier (guards, PPE)

Reduce amount

Reduce sound levels

Modify rate of release

Pressure reducing valves

Modify qualities

Blow out panels on elevator legs



Reduce Risk – Choose Strategy

Factors in Choosing Safety Strategy

Risk level – Severity & Frequency of Injury Potential

Regulations

Function interference

Cost



Understand Risks - Costs

Sales Required to Pay for an Accident

Profit Margin		1%	2%	3%	4%	5%
Accident Cost	\$1,000	100,000	50,000	33,000	25,000	20,000
	\$5,000	500,000	250,000	167,000	125,000	100,000
	\$10,000	1M	500,000	333,000	250,000	200,000
	\$25,000	2.5 M	1.250M	833,000	625,000	500,000
	\$50,000	5.0M	2.5M	1.667M	1.250M	1M
	\$100,000	10M	5M	3.333M	2.5M	2M
	\$150,000	15M	7.5M	5M	3.750M	3M
	\$200,000	20M	10M	6.666M	5M	4M

Accident Costs = Direct + Indirect Costs



Understand Risks - Costs

Direct Costs

Indirect Costs

- 2 to 20 times the direct costs
- Hidden



Like this iceberg, hidden costs of accidents are not visible on the surface, but are there just the same!



Understand Risk –Costs

Direct Costs

- Definite and known costs.
- Worker's compensation premium.
- Costs for repair/replacement of damaged equipment & materials.



Understand Risk - Costs

Indirect Costs



- Hidden
- Other non-billable costs of an accident
- Internal systems adapting to the accident
- 70%-90% of the total true accident cost.



Understanding Risk - Costs



Understand Risk - Costs

Claims reported:

- > 3 days after injury add:
 - 16% to Medical Costs
 - 38% to Indemnity Costs
- > 12 days after injury increase likelihood of Attorney Representation
 - 67% for Medical Claims
 - 69% for Indemnity Claims



Emergency Pre-Planning

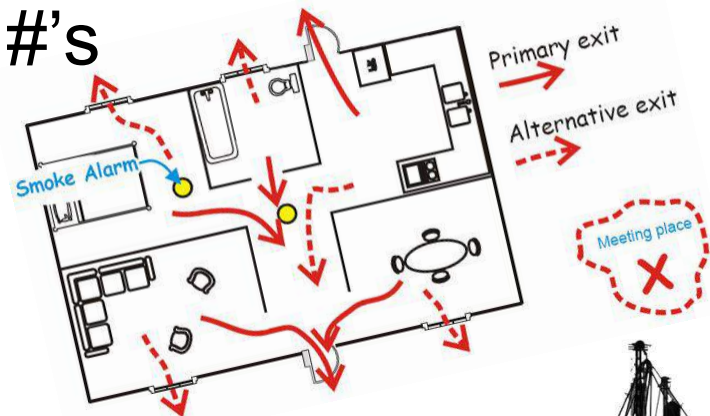
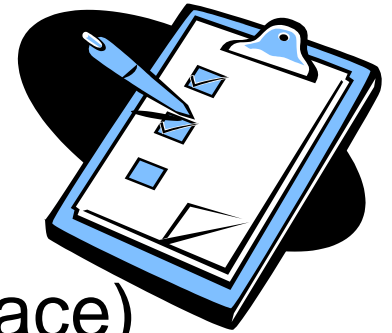
**EMERGENCY
EXIT
ONLY**



Emergency Action Plan

On- site procedures for Facility/Farm

- Emergency escape
- Critical plant or farm operations
- Account for all employees (meeting place)
- Rescue & medical duties (not required)
- Post emergency phone #'s
- Contact person
- Alarm system



On-site Safety Plan - Emergency Escape Plan

OSHA Requirements:

- At least two means of escape from bin tops & galleries.
- Elevators built after 3-30-88 have two means of escape from tunnels.
- Tunnels of existing elevators have at least one means of escape.



Action Plan with Rescue Squad

- Meet with local squad annually.
- Have local squad tour elevator or farm.
- Show location of electric controls, water, equipment, etc.
- Identify nearest Technical Rescue Team.
- Communicate with 911 dispatch.
- Train annually with local department (commercial).



Summary

- Discussed the 6 Major Grain Hazards.
- Discussed abatement strategies.
- Reviewed OSHA Grain Standard.
- Reviewed appropriate personal protective equipment.
- Explained principles of safety risk management.
- Emphasized pre-planning for emergencies.



Importance of Managing Risks in Grain Handling

Protects the most valuable resource we have in our agricultural industry –
“Our Workers!”





The following slides are for printing and animation sequence only. They do not need to be shown.



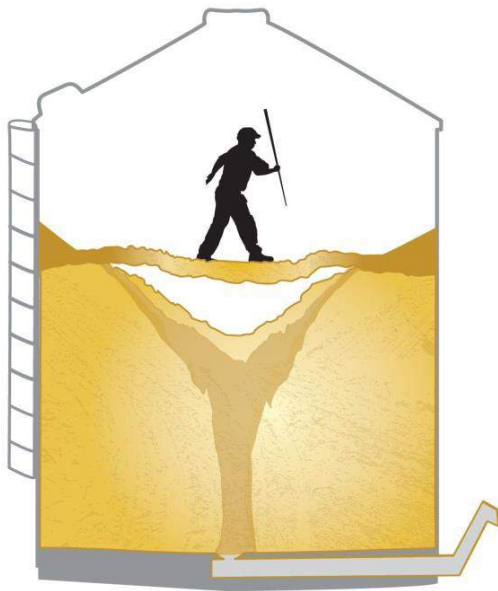
Bridged or Crusted Grain

- “Bridging” - Grain forms crust over top layers & creates an empty space beneath.
- Bridge can collapse when a worker walks on it & bury him.

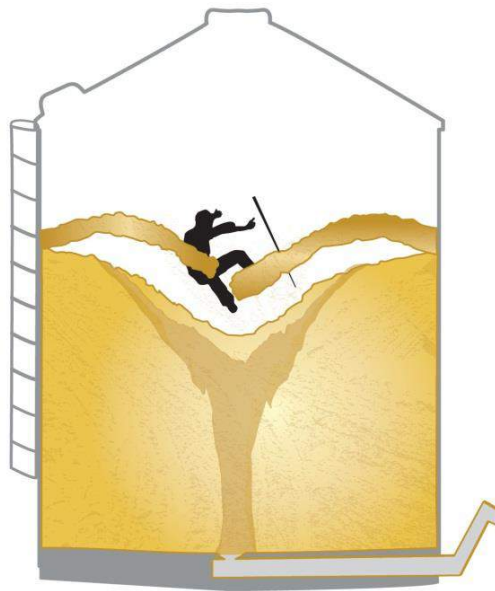


Bridged or Crusted Grain

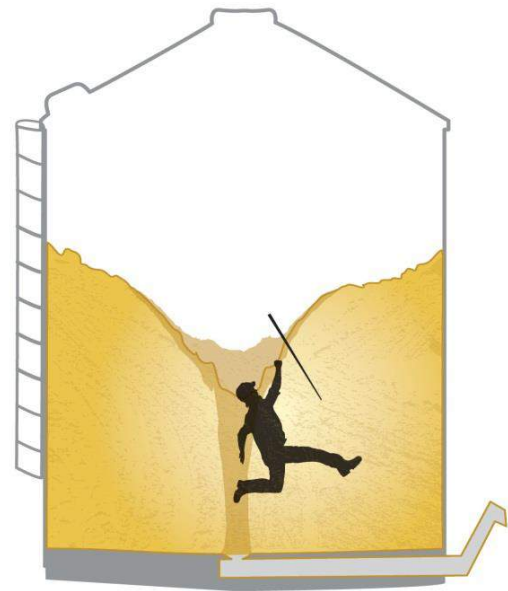
Cavity created by previous partial unloading of grain – A dangerous situation.



Bridged grain falls into airspace when unloading starts – traps worker instantly.

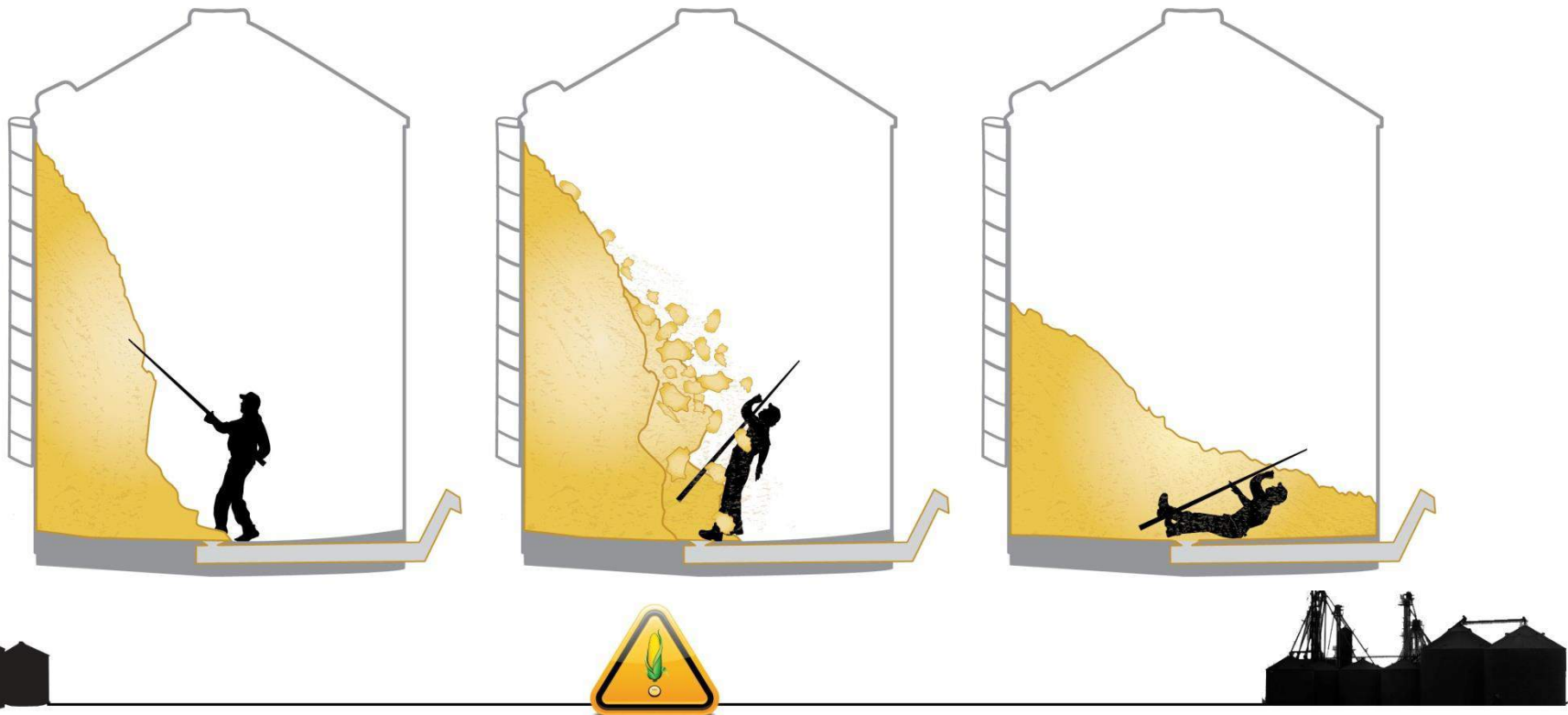


Before grain flow can be stopped, worker is covered. Suffocation occurs in seconds.



Avalanching Grain

- A grain pile can avalanche unexpectedly or when the worker attempts to dislodge it.

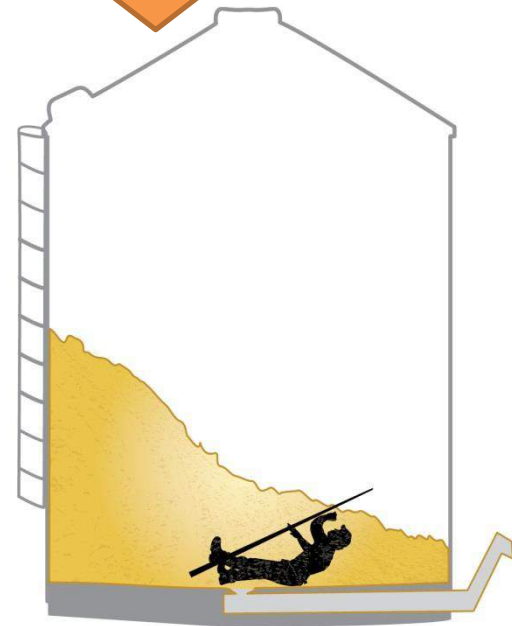
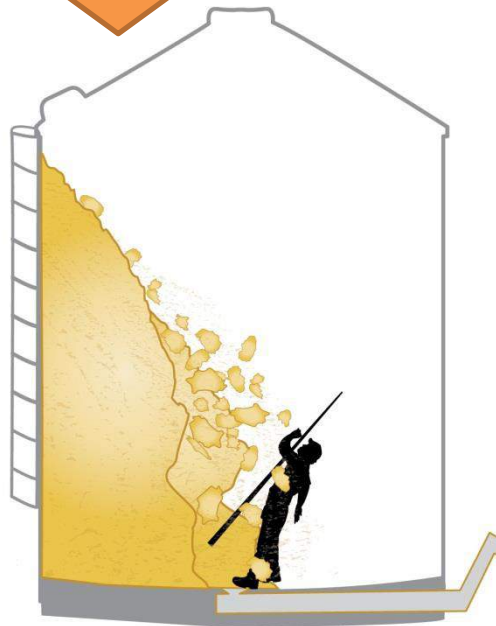
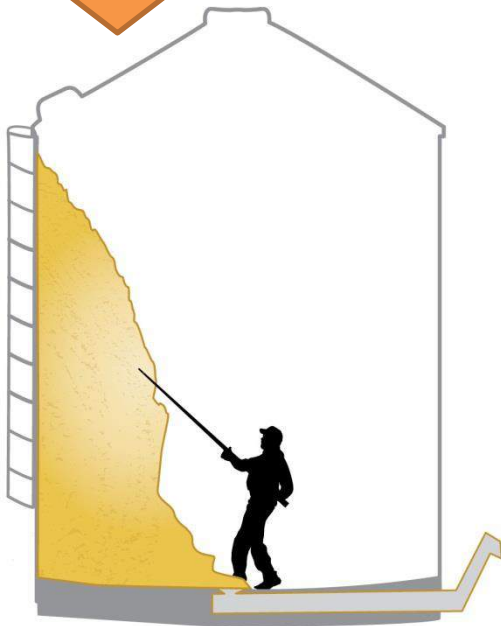


Avalanching Grain

BEWARE – Never work underneath a steep pile of grain.

A few feet of grain has enough force to knock a worker down & make him helpless to free himself.

Grain will bury & suffocate a worker in seconds.



Ladder Safety – Incorrect Use



Wrong
way



Climbing
on Braces



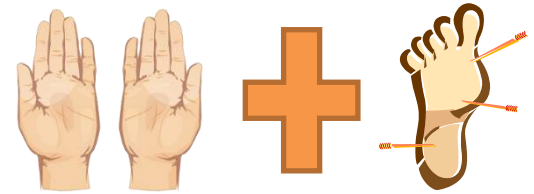
Carrying
Materials



Over reach



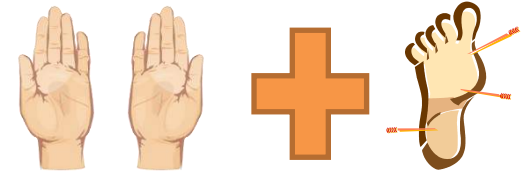
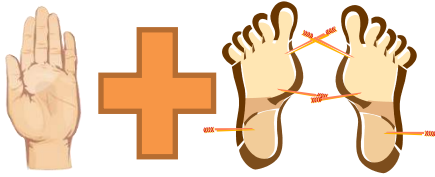
Ladder Safety – Correct Use



- 3 point contact
- Hands free (tools in belt)
- Facing job task
- Centered between rails
- Below top rungs
- Non-slip shoes



Ladder Safety – Incorrect Use



- 3 point contact
- Hands free
(tools in belt)
- Facing job task
- Centered
between rails
- Below top rungs
- Non-slip shoes



Entanglement Hazards

Common Machine Hazards

- Pinch Points
- Wrap Points
- Pull-in Points
- Shear Points

