

Safety Around Irrigation Systems

(PART - 1)

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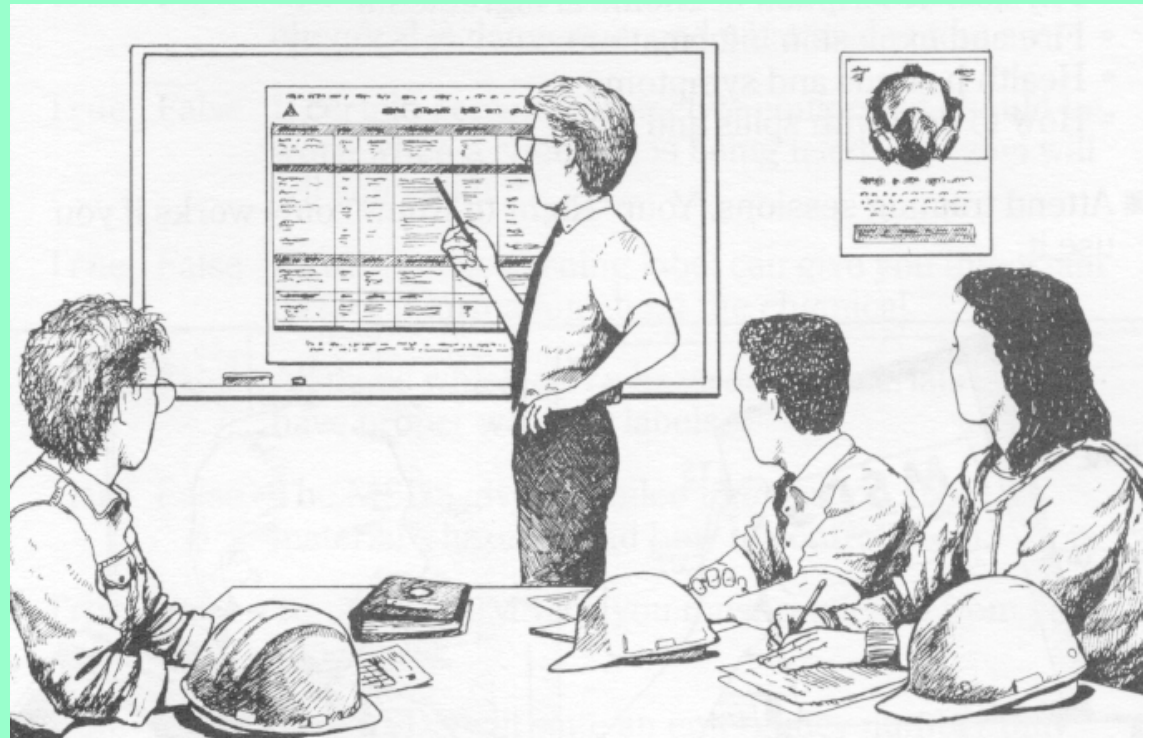


Irrigation Safety

- Just because an irrigation system and related equipment works doesn't necessarily mean it is safe or will fail in a safe manner.
- To ensure safety during operation, maintenance, inspection and testing of systems, employees must be aware of the potential hazards they might be exposed to and understand safe work practices necessary around these systems.

General Safety Training

- General safety training for any type of system involves the following areas:
 - Understanding Equipment and Installation Requirements (What systems look like).
 - Identifying Common Hazards.
 - Understanding Safe and Unsafe Work Practices.
 - Communicating Unsafe Equipment and Installations to Appropriate Entities.



Irrigation System Accidents

- There are different types of potential accidents that can cause injury or death when working on or around irrigation systems including:
 - Electrical Contacts/Accidents
 - Contacts/Entanglements with Moving Parts
 - Chemical Exposures/Poisonings
 - Falls from the System
 - Drowning
 - Physical (Head, Eye, Ear, Hand & Foot) Accidents

Irrigation Systems Contain

- **A Pumping System**
 - One or more pumps generally powered by fossil fuel engines or electric motors.
 - Connects to water distribution system.
- **A Distribution System**
 - Many different types (ditch, gated pipe, center pivots, side-roll, big-gun, etc.), many utilizing electrical powered motors and drive-trains to move the system over/across the field.

Pumping System



Irrigation Problem Areas

- Typical irrigation accidents fall into the following three categories or combinations including:
 - Faulty Equipment and/or Installation by manufacturer, dealer or installer.
 - Equipment/Installation correct but modified or poorly maintained by owner (state of disrepair).
 - Unsafe work practices by individuals during maintenance, repair and testing.

Equipment Design/Installation

- The first link in the chain of irrigation safety is proper equipment design, selection, and installation by manufacturers, equipment dealers, and installers.



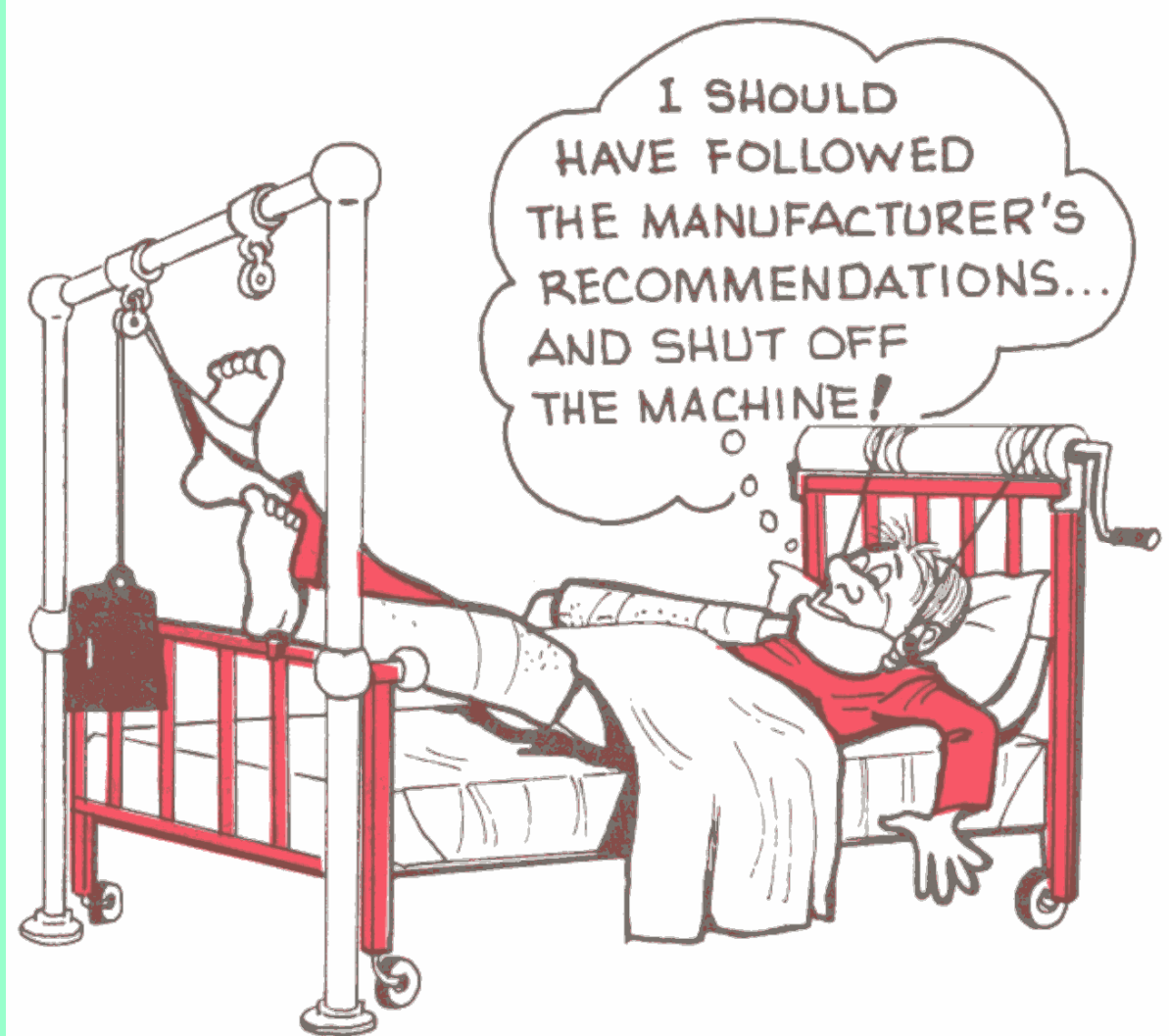
Irrigation System Maintenance

- The second link the the irrigation safety chain involves maintaining properly installed systems in good shape.
 - Many irrigation systems are poorly maintained and fall into states of disrepair.
 - Many systems have been modified or repaired using sub-standard equipment.



Safe Work Practices

- Even if the equipment and installation is correct and the system has been well maintained, people still need to use safe work practices to avoid the normal hazards associated with operation of the equipment.



Irrigation Safety Requirements

- Manufacturers must design equipment to safety standards.
- Dealers must install equipment correctly.
- Owners, Irrigators and Service people must maintain equipment correctly.
- Owners, Irrigators and Technicians must use Safe Work Practices.



Irrigation System Hazards Include:

- Electrical Contacts
 - overhead power line contacts, short circuits, working on energized equipment, lightning strikes.
- Contact/Entanglement with Moving Parts
 - working on energized equipment including PTO's, drivelines, gearboxes, tires, etc.
- Chemical Exposures/Poisonings
 - exposure vs ingestion
- Falls from the System
- Drowning - rivers, lakes, canals, ponds, pits, etc.
- Physical Damage (Head, Eye, Ear, Hand & Foot)

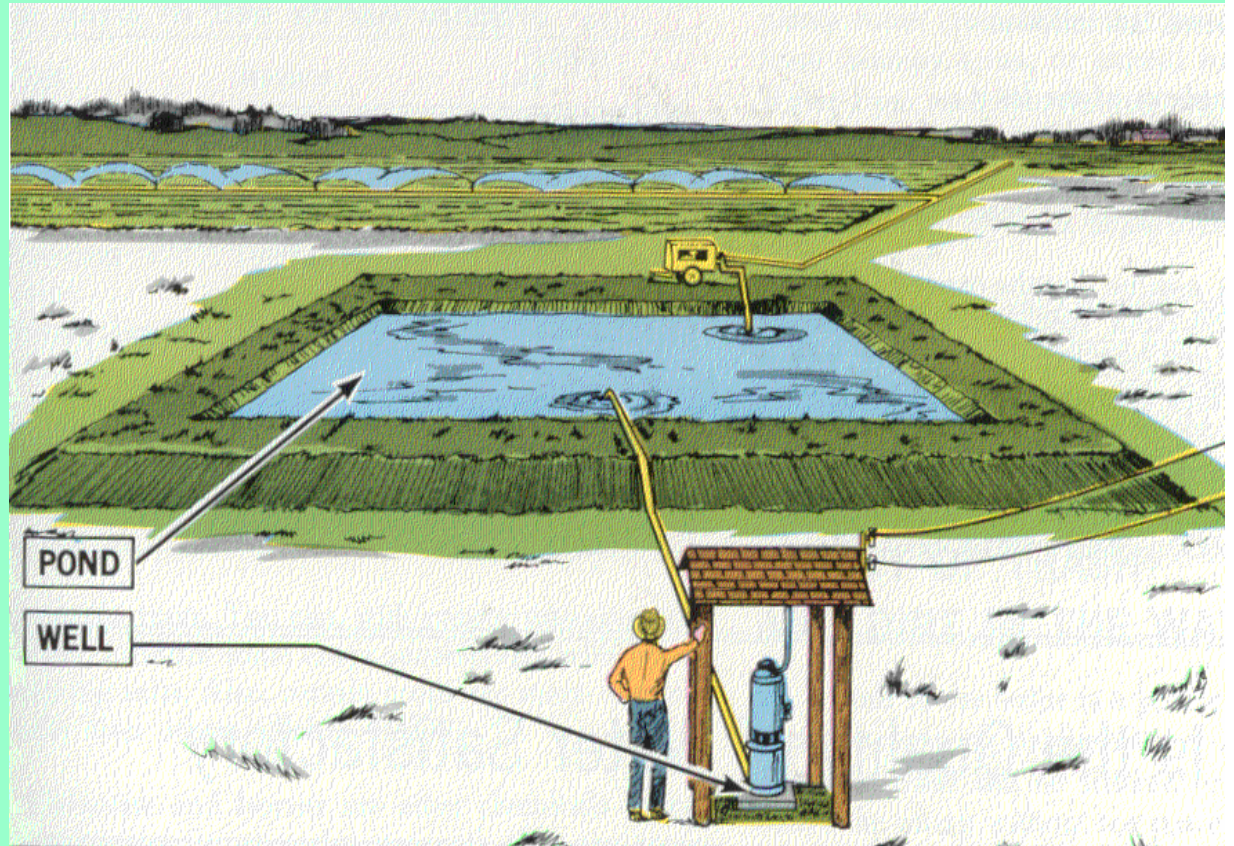
Irrigation Hazard - Drownings

- Drowning are not a common source of irrigation accidents.
- Accidents do occur and the potential for hazard is always there due to the amount of water present with systems pumping from lakes, rivers, streams, ponds, or pits.



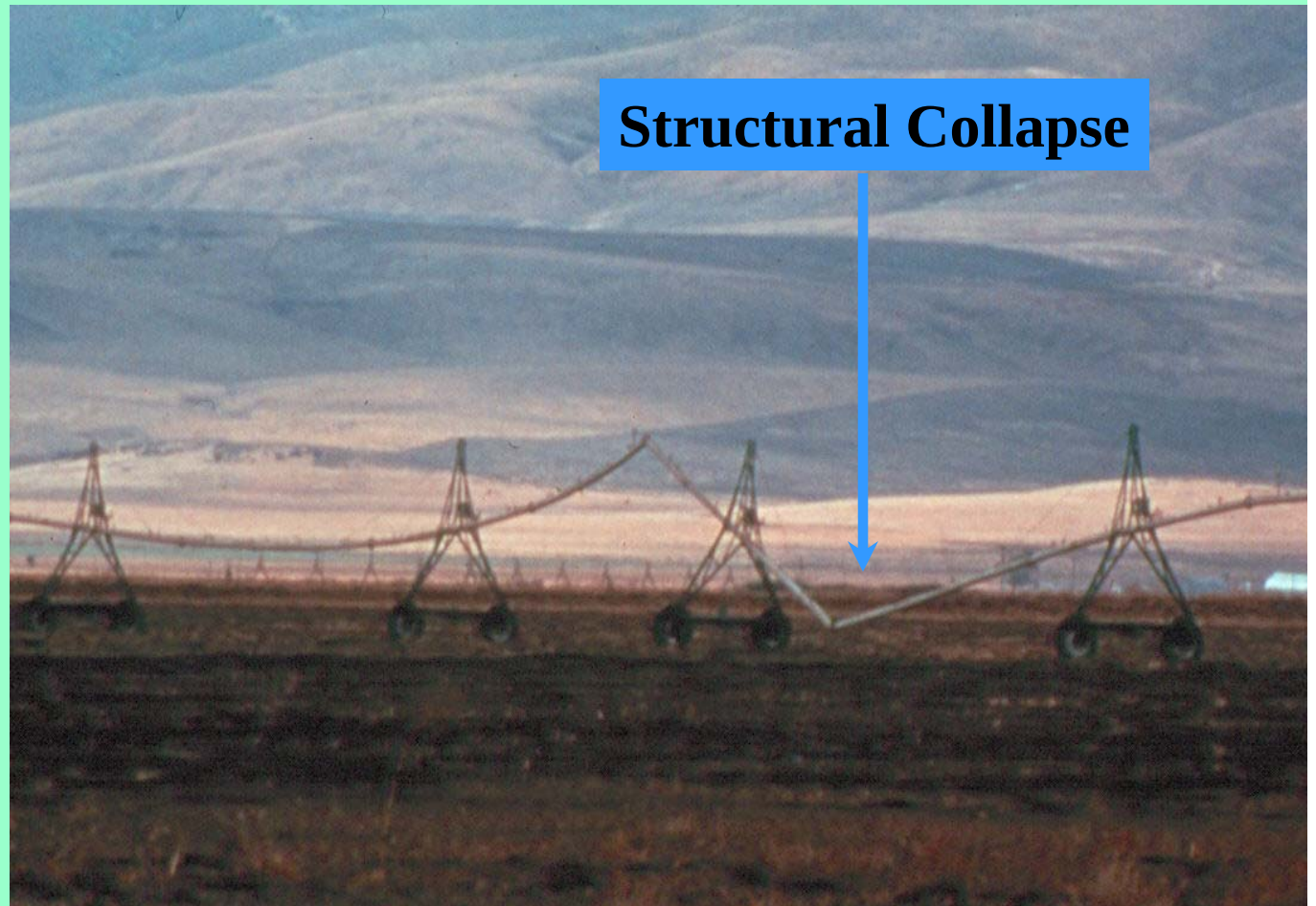
Irrigation Hazard - Drowning

- Most accidents involve falls and slips or recreational activities in water bodies such as rivers, lakes, ponds, or pits used for irrigation.
- Be aware of possible fall and slip hazards when working in the vicinity of bodies of water such as rivers, lakes, ponds, and pits used for irrigation.



Irrigation Hazard - Structural Integrity

- Visually inspect for any signs of loose or missing bolts or visual indications that an irrigation machine is close to a structural collapse before moving the machine or climbing onto the machine.



Irrigation Hazard - Falls

- Many irrigation systems are tall enough that falls from their structure can cause serious injury or death.
- Depending on where a person falls from the system, they may make contact with structural members and other sharp objects during the fall.



Irrigation Hazard - Falls

- There may be enough hand/fooholds for a person to scale/climb up onto the machine but it should not take the place of a ladder or other lift device.
- The metal structure of most self-propelled irrigation machines does not meet the requirements of a safe ladder.

Is this a Ladder?????



Irrigation Hazard - Falls

- Use a good ladder or stable lift device to perform overhead repair and maintenance on an irrigation machine.
- Ladders can also be dangerous when used in unleveled, tilled, muddy fields when not anchored properly.

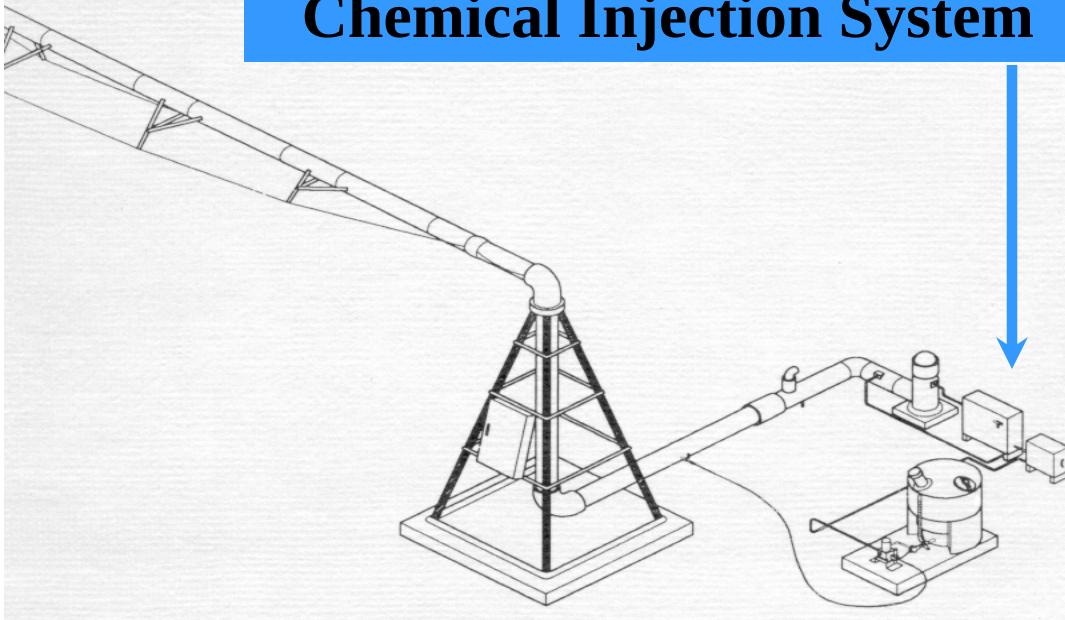


Irrigation Hazard

Chemical Exposure/Poisoning

- Increased use of chemigation/fertigation through irrigation systems has resulted in increased numbers of chemical exposures & poisonings.
- Chemical exposures can be through exposure to system water, standing water, or crops or drinking water from systems used for this purpose.

Chemical Injection System



Irrigation Hazard

Chemical Exposure/Poisoning

- Be careful of exposure to spray systems or crops under them when chemicals or fertilizers have been injected into the water.
- Don't drink from any system used to apply chemicals.
- Avoid areas of obvious chemical spills.

Fertigation/Chemigation Unit



**Do you think this water
puddle contains chemicals?**

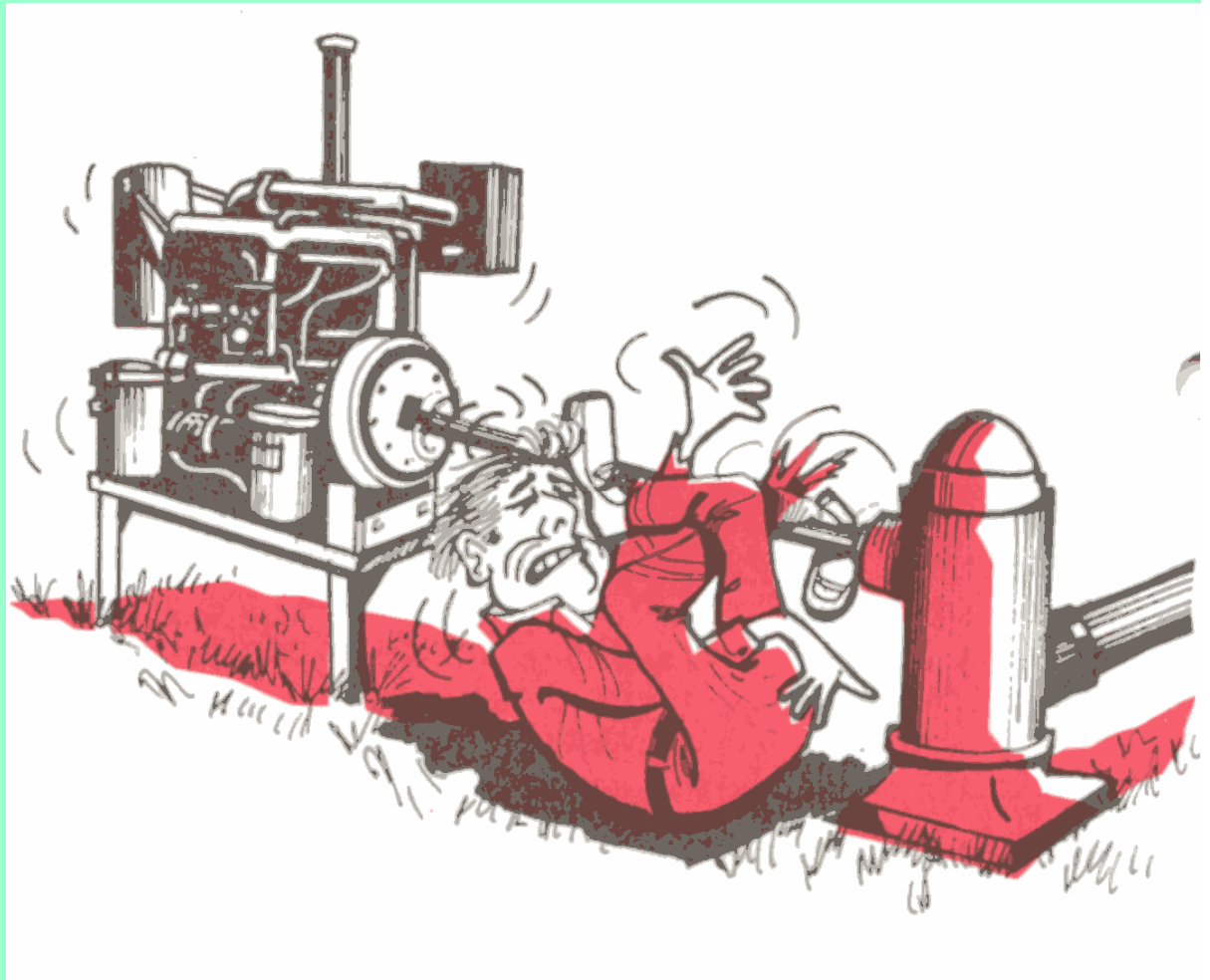
Irrigation Hazard - Water Jets

- Avoid getting your body in contact with high pressure water streams of any type, especially end guns on self-propelled machines.
- High pressure water jets can cause physical harm, especially to eyes, and can also cause falls from irrigation systems.



Irrigation Hazard - Entanglements

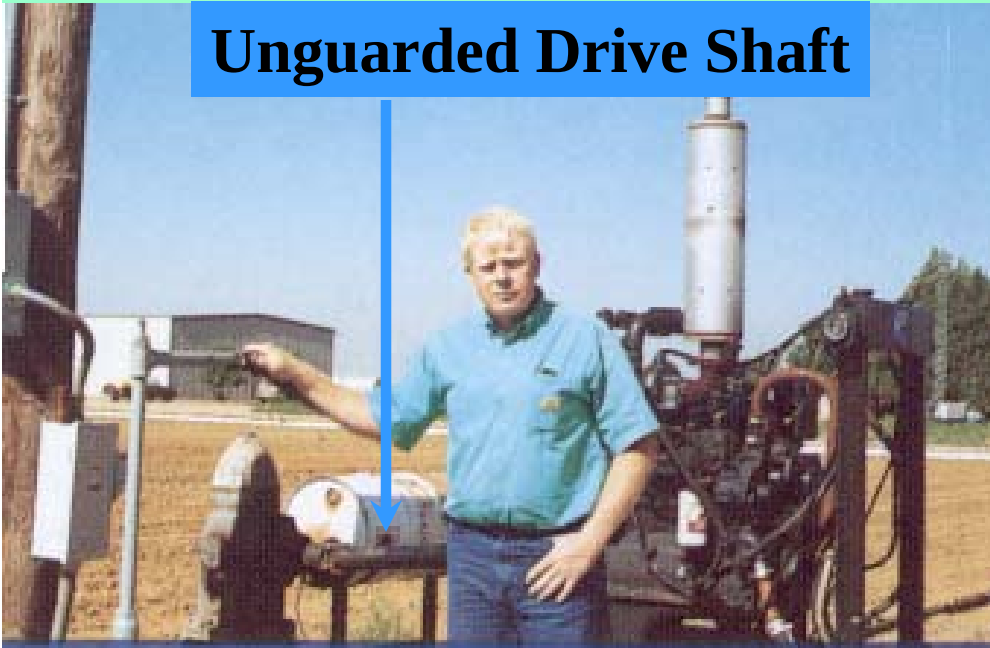
- Do not approach or work around unguarded power take-off shafts, belts and other and other power transmitting devices.
- Alert others in the vicinity and the owners or operators to the hazard.
- Avoid wearing loose clothing or long hair in the vicinity of rotating equipment.



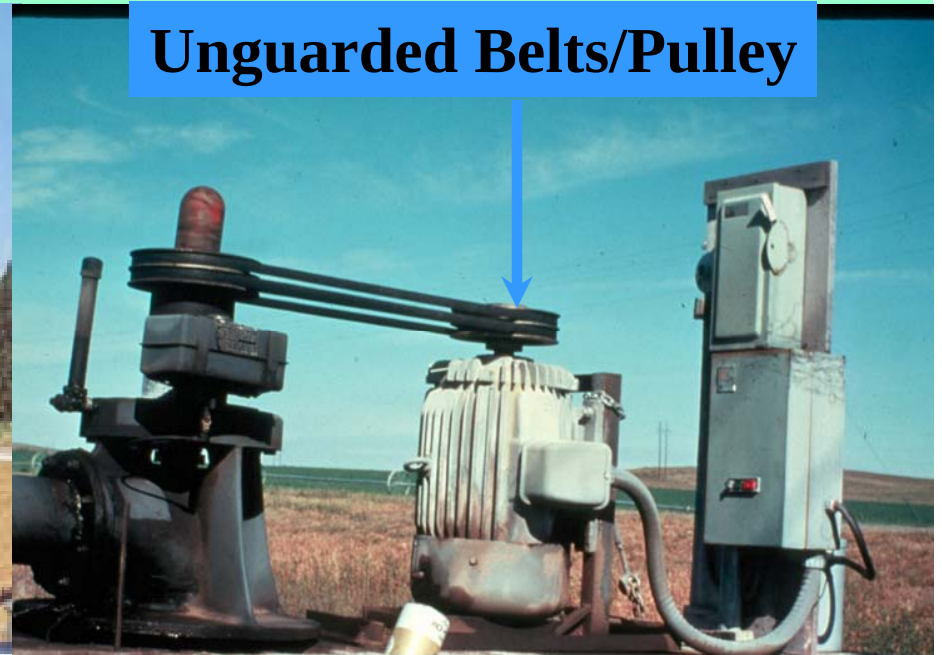
Irrigation Hazard - Entanglements

- Be alert to unguarded power take-off shafts, belts, and other power transmitting devices.
- Replacements and retro-fit guards are available from dealers for older machines.

Unguarded Drive Shaft



Unguarded Belts/Pulley



Irrigation Hazard - Entanglements

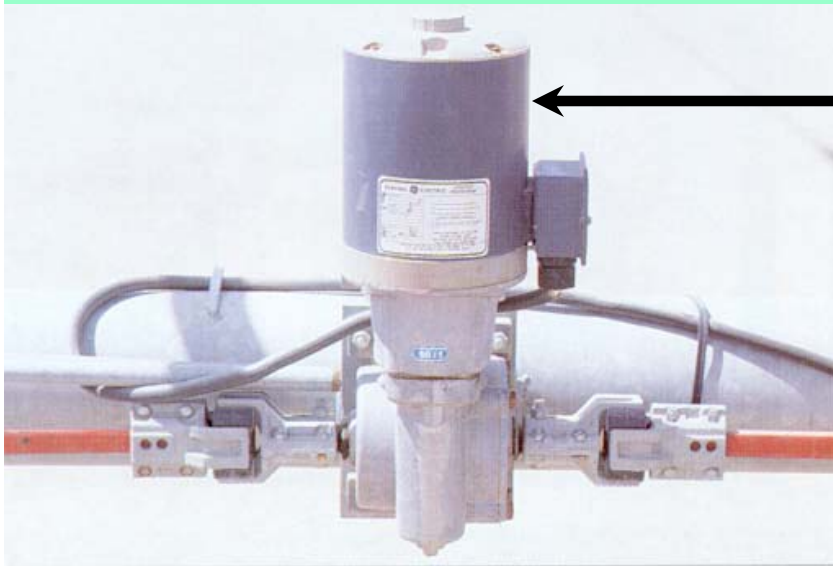
- OSHA does not require driveshaft covers on center pivot irrigation machines.
 - Slow rotation speed.
 - Operator is supposed to disconnect the power prior to any maintenance or repair work.
 - Most manufacturer's install them to prevent crop wrappage.



Machine with telescoping driveline covers

Irrigation Hazard - Entanglement

- Industry standards require manufacturers to provide safety signs on motors/equipment that could start automatically to alert personnel performing repair & maintenance to the potential hazard and to shut off power before working on the system.



CAUTION

This machine may start automatically.
Do not service until machine disconnect
is in "OFF" position and locked.

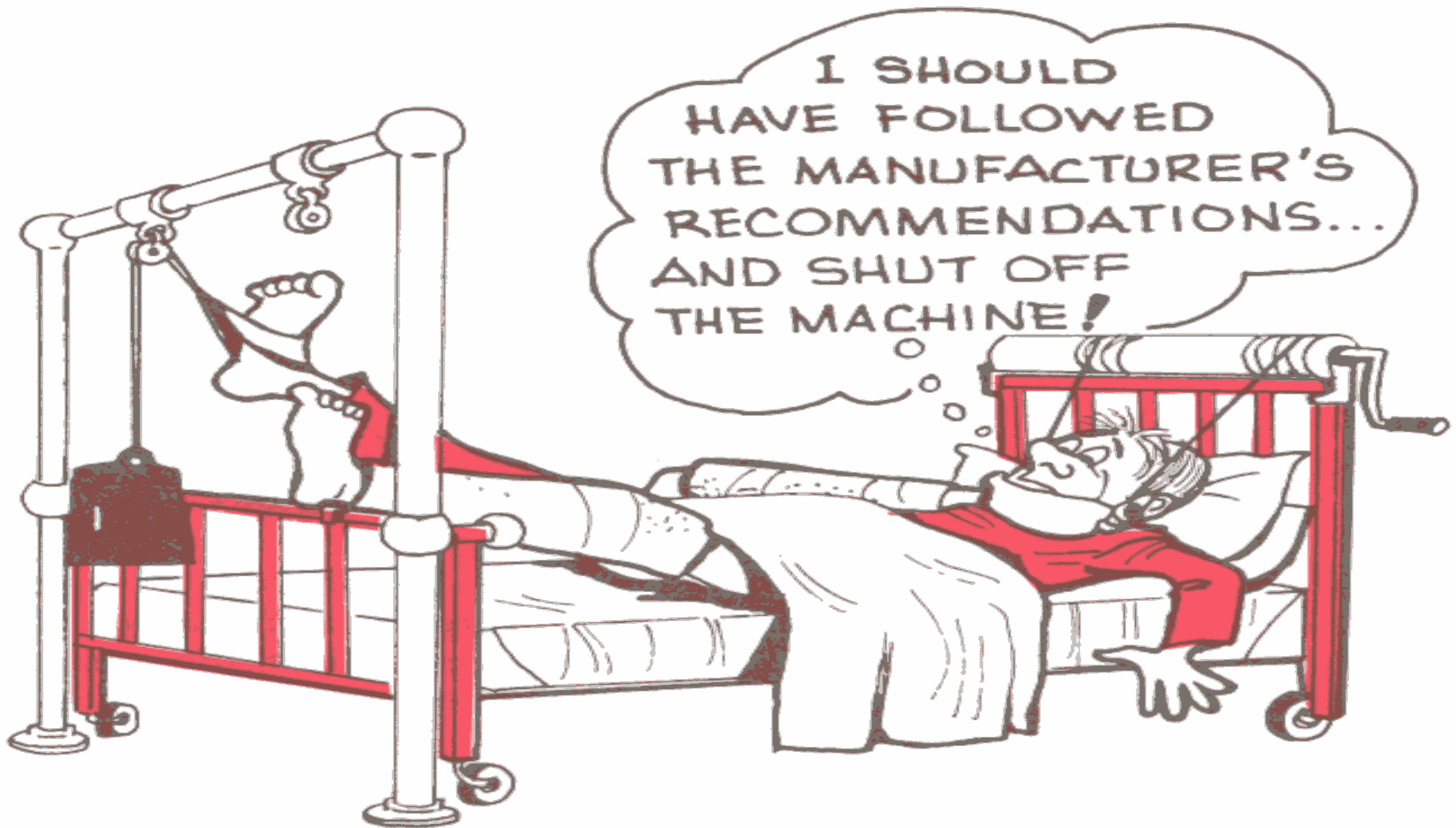
Irrigation Hazard - Entanglements

- Never attempt to remove vegetation or other foreign materials from rotating equipment while it is moving or the equipment is energized.
- ALWAYS shut down the machine for repair or maintenance.



People can suffocate when working on energized equipment and the driveline bolt grabs their coverall sleeve and wraps tight.

Shut Down the System Before Working On It!!!!!!!!!!!!



Irrigation Hazard - Run Overs

- Keep vehicles and other equipment out of the paths of self-propelled irrigation machines.
- Many of these machines have excellent traction and can “climb” over and crush fairly large objects like cars, pick-ups, and even small buildings due to their weight.



It's not funny the first time it's your vehicle

Irrigation Hazard - Squeeze Points

- Keep in mind that even if equipment is not run over, you could get squeezed between the system and a fixed piece of equipment it barely misses.

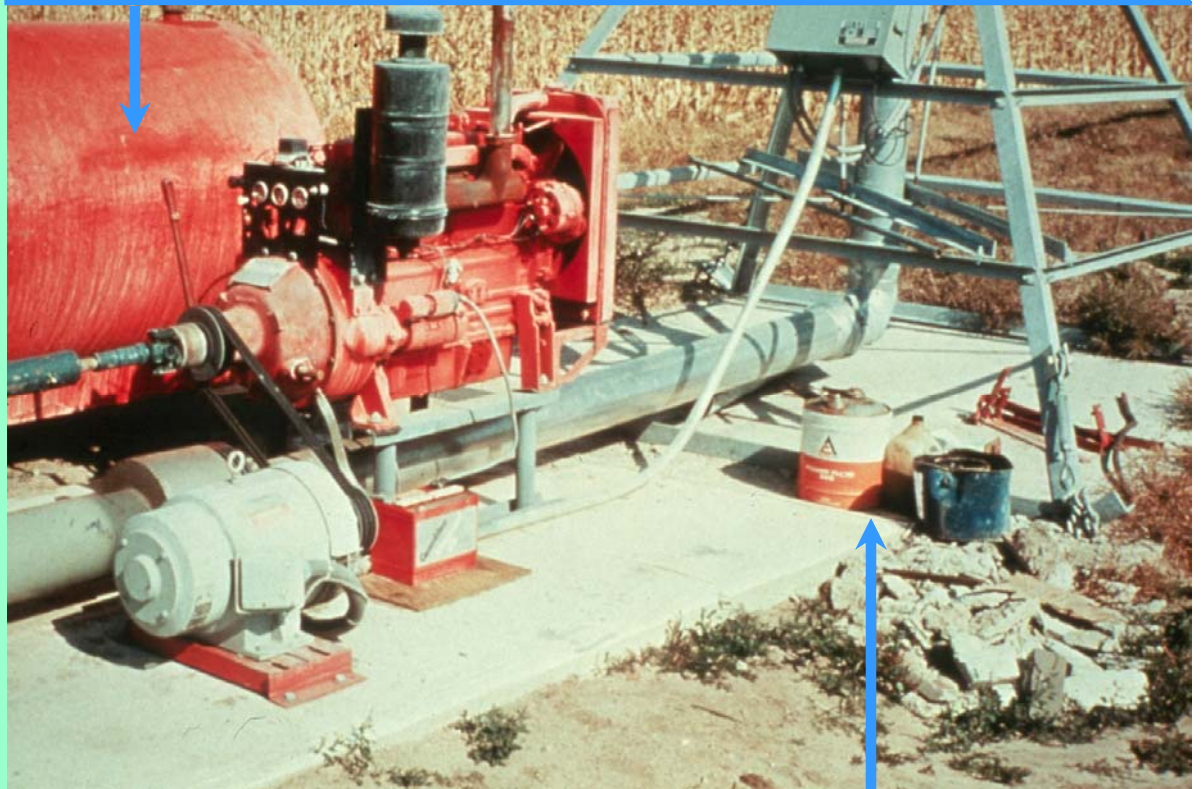


Note location of wheel track to pump

Irrigation Hazard - Fuel Leaks

- Be alert to fuel leaks from storage tanks and fuel lines.
- Sparks from electrical shorts can ignite these fuels or any gas and oil accumulations from leaking storage systems, fuel lines or improper storage containers.

Fuel Storage Tank



**Oil and lubricant storage.
Are most systems this clean???**

Irrigation Hazard - Fuel Ignition

- Gasoline, natural gas and propane all ignite from 2 to 15 percent vapor concentration.
- Be careful around unmarked storage containers because there is a high probability they do not contain what their label indicates.

