Basic Safety

SAFETY

- Safety is a learned behavior and attitude.

- Safety is a way of working that must be incorporated into the company as a culture.

Safety Culture

- A safety culture is created when the whole company sees the value of a safe work environment.

Benefits

- Fewer at-risk behaviors
- Lower accident rates
- Less turnover
- Lower absenteeism
- Higher productivity

Strong Safety Culture

- Perceiving safety as a core value.
- Strong leadership
- Establishing and enforcing high standards of expectation and performance

Strong Safety Culture

- The involvement of all employees

- Effective communication and commonly understood and agreed-upon goals.

Strong Safety Culture

- Using the workplace as a learning environment
- Encouraging workers to have a questioning attitude
- Good organizational learning and responsiveness to change

Strong Safety Culture

- Providing timely response to safety issues and concerns
- Continually monitoring performance.
- Lower turnover rate

EMR

- Experience modification rate.

- Companies with high EMR's are sometimes excluded from bidding.

Accidents

- An unplanned event that may or may not result in personal injury or property damage.

- Accidents are often categorized by their severity and impact.

Near-miss

- An unplanned event or occurrence in which no one was injured and no damage to property occurred, but during which either could have happened.

Property Damage

- An unplanned event that resulted in damage to tools, materials, or equipment, but no injuries.

Minor injuries

- Personnel may have received minor cuts, bruises, or strains, but the injured workers returned to full duty on their next regularly scheduled work shift.

Serious or disabling injuries

- Personnel received injuries that resulted in temporary or permanent disability.

Fatalities

- Death

Accident Ratio Study

Accident Costs

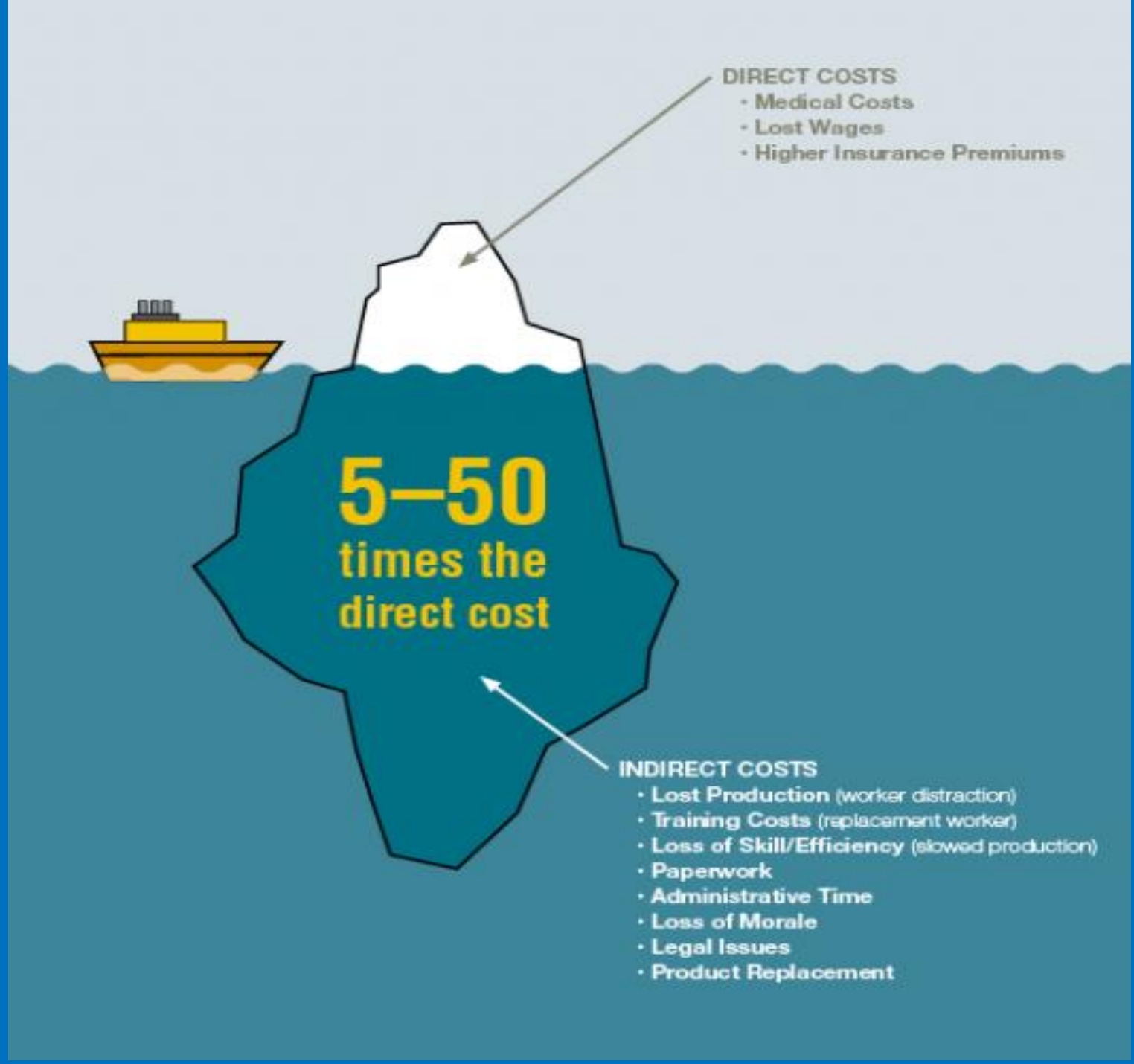
- **Direct costs** include medical costs and as well as workers compensation insurance benefits, as well as liability and property damage insurance compensation.

Accident Costs

- **Indirect costs** are the “hidden” costs that can and usually exceed the direct costs of accidents from two to seven times.

Accident Costs HIDDEN EXPENSES

- Training replacement workers
- Accident investigation
- Scheduling delays
- Lost productivity


DIRECT COSTS
· Medical Costs
· Lost Wages
· Higher Insurance Premiums
5–50
times the
direct cost
INDIRECT COSTS
· Lost Production (worker distraction)
· Training Costs (replacement worker)
· Loss of Skill/Efficiency (slowed production)
· Paperwork
· Administrative Time
· Loss of Morale
· Legal Issues
· Product Replacement

What causes Accidents ?

- Failure to communicate
- Poor work habits
- Alcohol or drug abuse
- Lack of skill
- Intentional acts

What Causes Accident ?

- Unsafe acts
- Rationalizing risks
- Unsafe conditions
- Management system failure

Failure to Communicate

All worksites have specific markings and signs to identify hazards and provide emergency information.

Informational Signs

Informational signs provide general information. These signs are blue

Safety Signs

Safety signs give general instructions and suggestions about safety measures. The background is white; most have a green panel with white letters.

Caution Signs

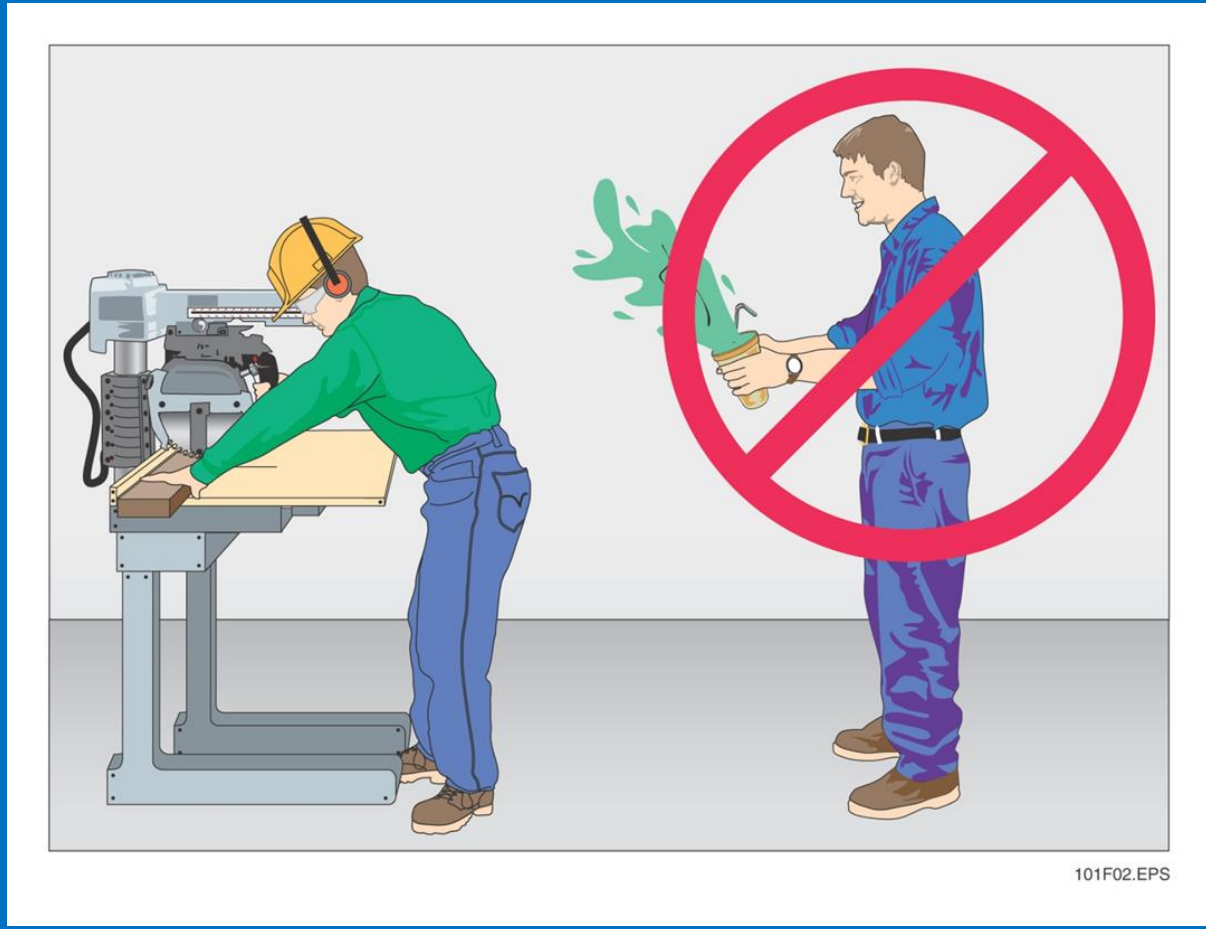
Caution signs tell you about potential hazards or warn against unsafe acts. Caution signs are yellow and have a black panel with yellow letters.

Danger Signs

Danger signs tell you that an immediate hazard exists and that you must take certain precautions to avoid an accident. Danger signs are red, black and white.

Poor Work Habits

- Procrastination
- Carelessness
- Horseplay



Alcohol and Drug Abuse

- Alcohol and drug abuse costs the construction industry millions of dollars a year in accidents, lost time, and lost productivity.

Lack of Skill

- You should never operate a power tool until you have been trained to use it.

- Lack of skill can cause accidents quickly.

Intentional Acts

- When someone purposely causes an accident, it is called an intentional act.

Unsafe Acts

- A change from an accepted, normal, or correct procedure that usually causes an accident.

Rationalizing Risks

- Crossing boundaries because no activity is in sight.
- Not wearing gloves because it will take only a minute to make a cut
- Removing your hard hat because you are hot and you cannot see anyone working overhead
- Not tying off your fall protection because you only have to lean over by about a foot.

Unsafe Conditions

- Anything that reduces the degree of safety normally present.

- Examples: poor housekeeping, excessive noise, inadequate guard of moving parts, poor lighting.

Management System Failure

- Put all policies and procedures in writing
- Enforce all safety policies and procedures fairly and consistently.
- Evaluate supplies, equipment, and services to see whether they are safe
- Provide regular safety training for employees.

Housekeeping

The major goal of housekeeping is to prevent accidents.

Good housekeeping reduces the chances for slips fires, explosions and falling objects.

OSHA

- **Occupational Safety and Health Administration**

- The mission on OSHA is to save lives, prevent injuries, and protect the health of America's workers.

- Nearly every worker in the nation comes under OSHA's jurisdiction.

OSHA Inspections

- Imminent Danger – immediate risk of death or serious physical harm

- Catastrophe- requires hospitalization for 3 or more workers. Employers are required to report fatalities and catastrophe to OSHA within 8 hours.

- Workers compliant and referral inspections- complaints by workers, or a worker representative or from a recognized professional.

OSHA Inspections

- Programmed – high risk areas based on OSHA targeting and priority methods
- Follow-up – Completed after citations to assure employer has corrected violations
- Monitoring- long term abatement follow-up or to assure compliance with variances

Code of Federal Regulations

- Safety training and education
- Injury reporting and recording
- First aid and medical attention
- Housekeeping
- Illumination
- Sanitation

Code of Federal Regulations

- (PPE) Personal Protective Equipment
- Standards incorporated by reference
- Definitions
- Access to employee exposure and medical records
- Means of egress
- Employee emergency action plans.

General Duty Clause

- If a standard does not specifically address a hazard, then the general duty clause must be invoked.

Employee Rights and Responsibilities

- If you have been discriminated against for asserting your OSHA rights, you have the right to file a complaint with the OSHA area office within 30 days of the incident.

- Employers are required to maintain your medical records for 30 years after you leave employment.

Reporting Injuries, Accidents, Incidents

- Accidents- anything that causes an injury or property damage.
- Incident- anything that could have caused an injury or damage but because it was caught in time, did not.
- Injuries- All injuries should be report small or big.

Compliance

- Competent Person- One who is capable of identifying existing and predictable hazards in the surrounding or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Job Safety Analysis

- In the JSA the task at hand is broken down into its individual parts or steps and then each step is analyzed for its potential hazards.

- JSA can also be used as pre-planning tools.

Risk Assessment

- Risk – a measure of the probability, consequences, and exposure related to an event.

- Probability – the chance that a given event will occur.

Fall Hazards

- Falls account for 1/3 of all deaths in the construction trade.

- OSHA requires fall protection for platforms or work surfaces with unprotected sides or edges that are six feet or higher than the ground or level below it.

- **This is known as the six-foot rule.**

Personal Fall Arrest Systems

- Body harness
- Lanyards
- Lifeline
- Connecting devices
- Anchor points

Personal Fall Arrest Systems

- You should have your personal fall arrest system inspected monthly by a competent person.
- The D-ring or support point on a safety harness should be placed to the rear, between your shoulder blades.
- The other end of the lanyard should be attached to a strong anchor point located above the work area.

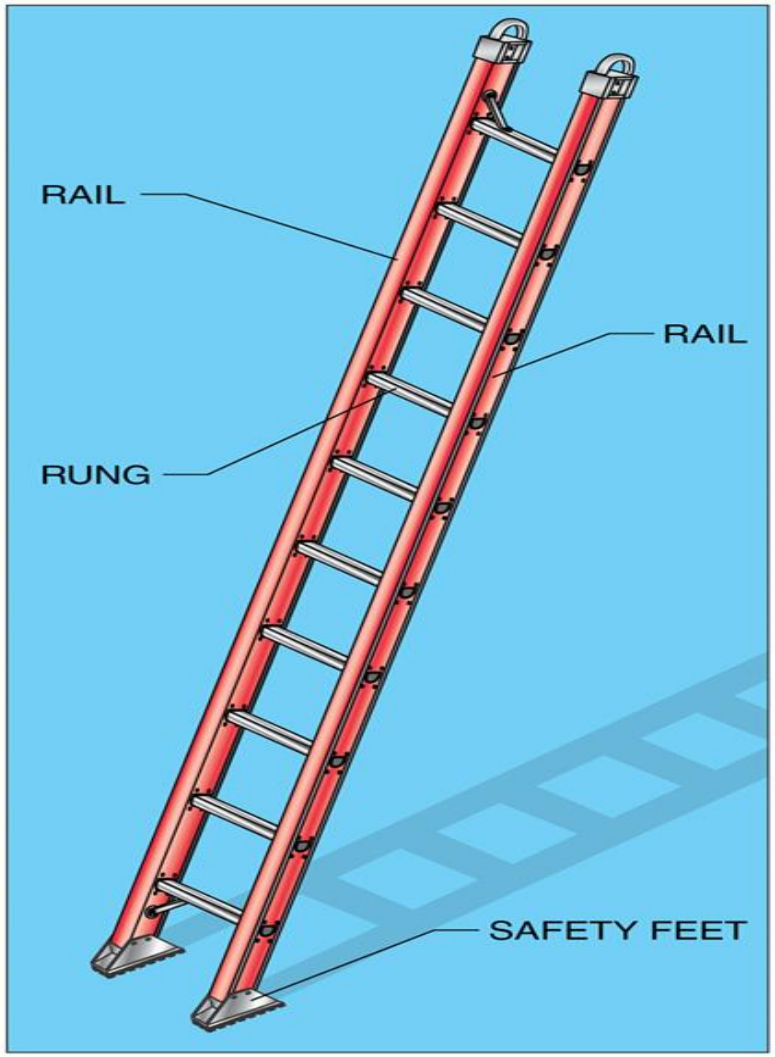
Ladders

- There are different types of ladders to use for different jobs.

- Selecting the right ladder for the job at hand is important to complete a job as safely and efficiently as possible

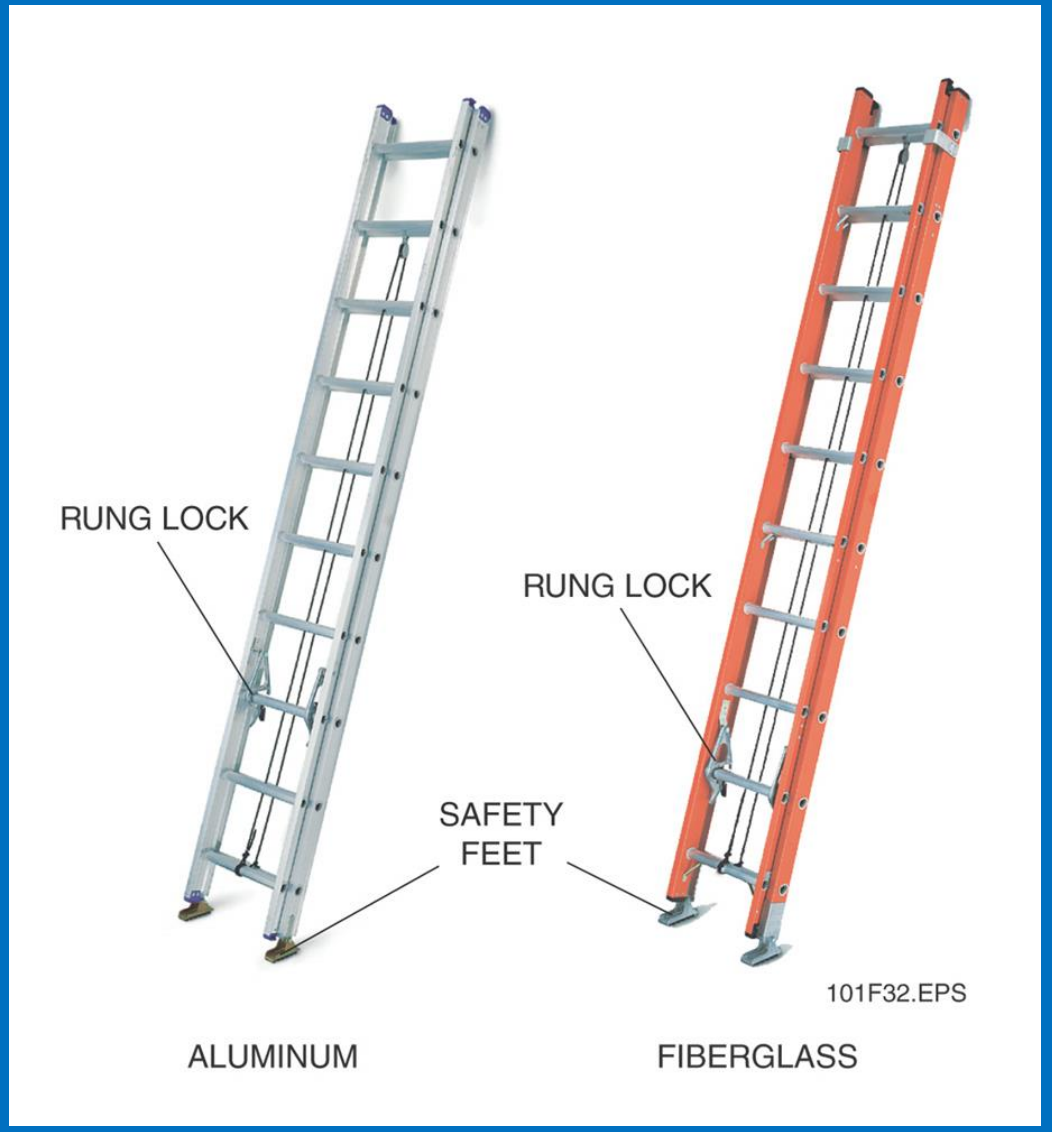
Straight Ladders

- Made of aluminum, wood, or fiberglass



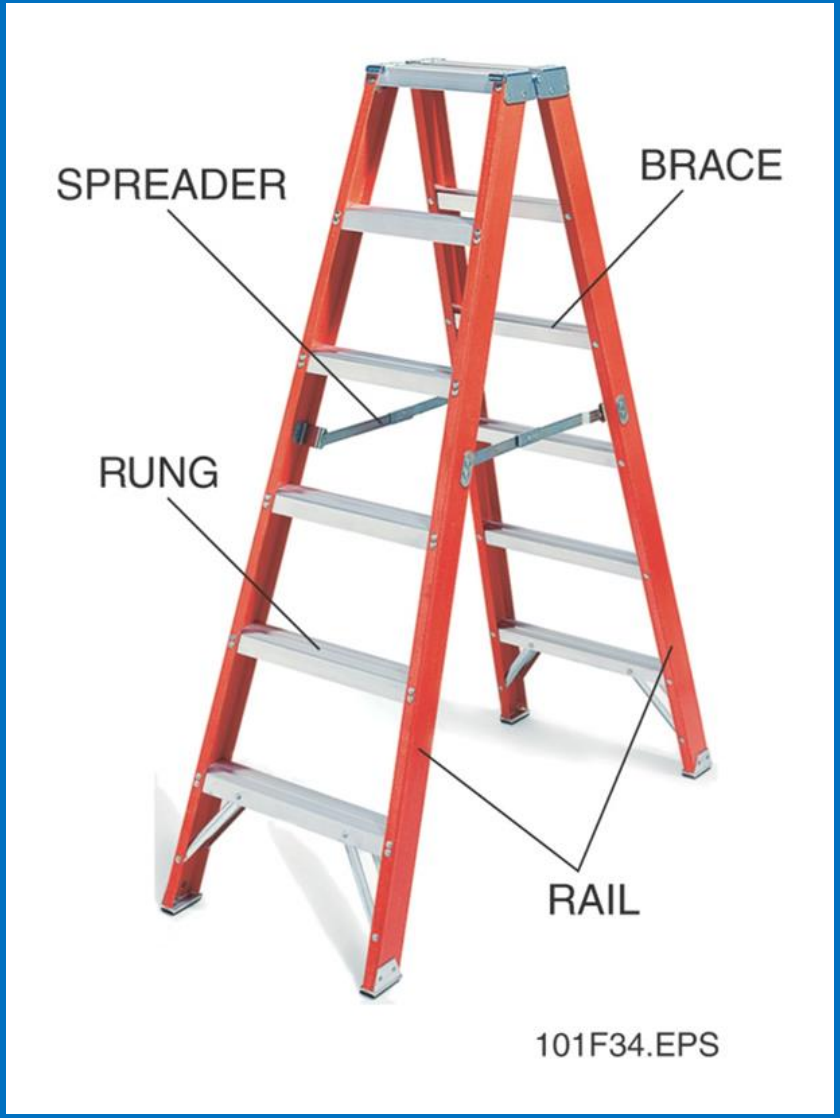
Extension Ladders

- Extension Ladders are actually two straight ladders. They are connected so you can adjust the overlap between them and change the length of the ladder as needed.



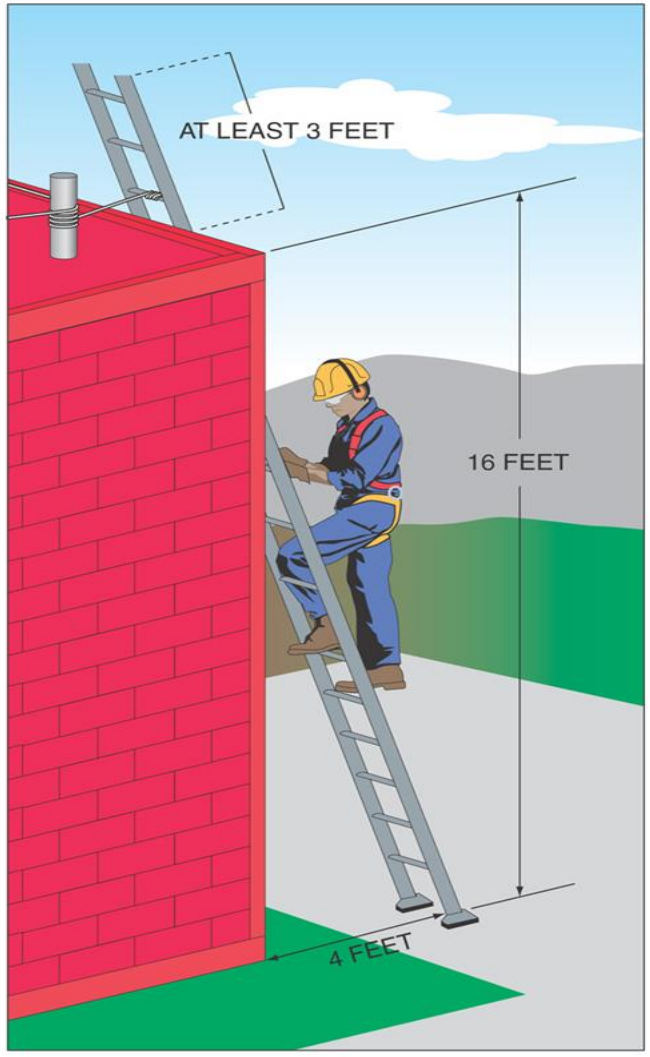
Step Ladders

- Step Ladders are self-supporting ladders made of two sections hinged at the top.
- The section used for climbing consists of rails and rungs like those on a straight ladder.
- The other section has rails and braces.



Using Straight Ladders

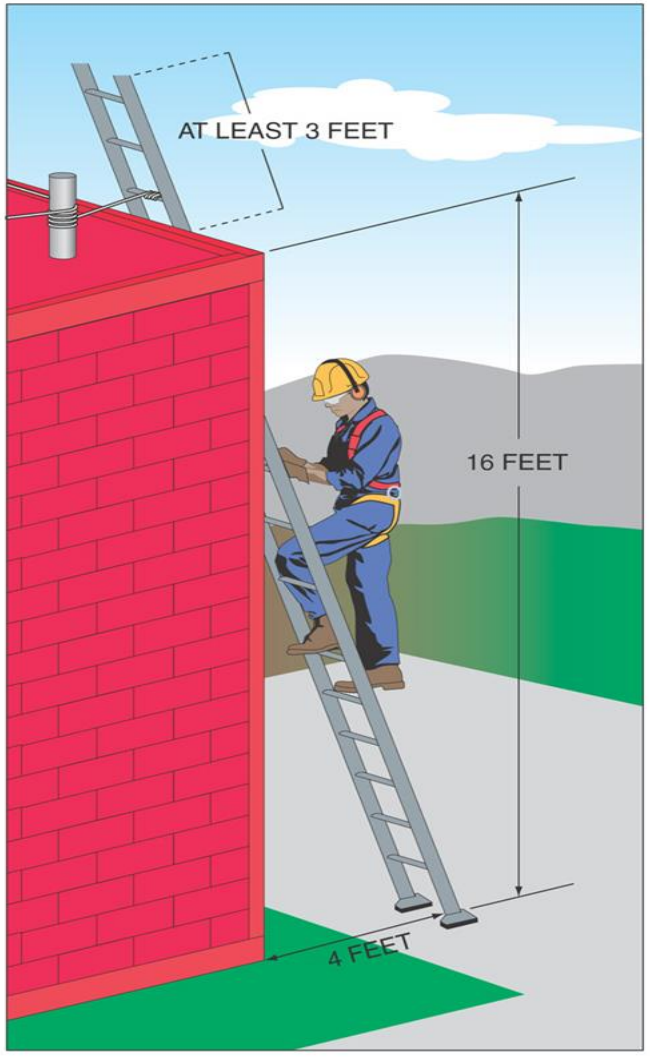
- If you are going to step off a ladder onto a platform or roof, the top of the ladder should extend at least three feet above the point where the ladder touches the platform, roof, side rails, etc.



Using Straight Ladders

- When climbing or working on a ladder it is important that you maintain **Three-Point Contact.**

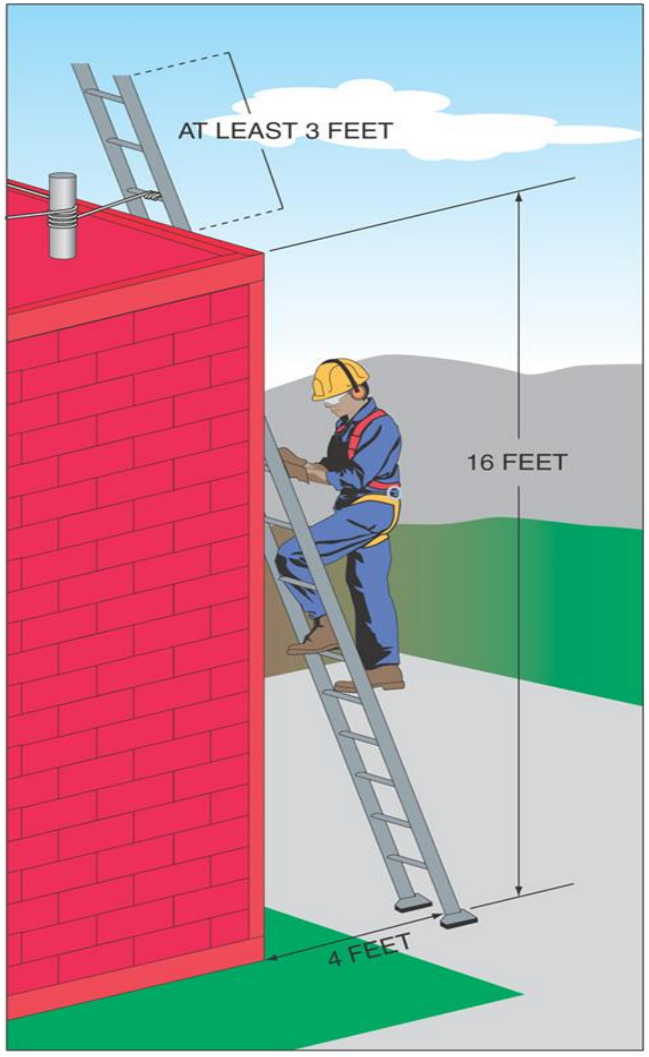
- This means having either two hands and one foot or two feet and one hand on the ladder at all times.



Using Straight Ladders

- The highest safe standing level on an extension ladder is the fourth rung from the top.

- If you stand higher, you may lose your balance and fall.



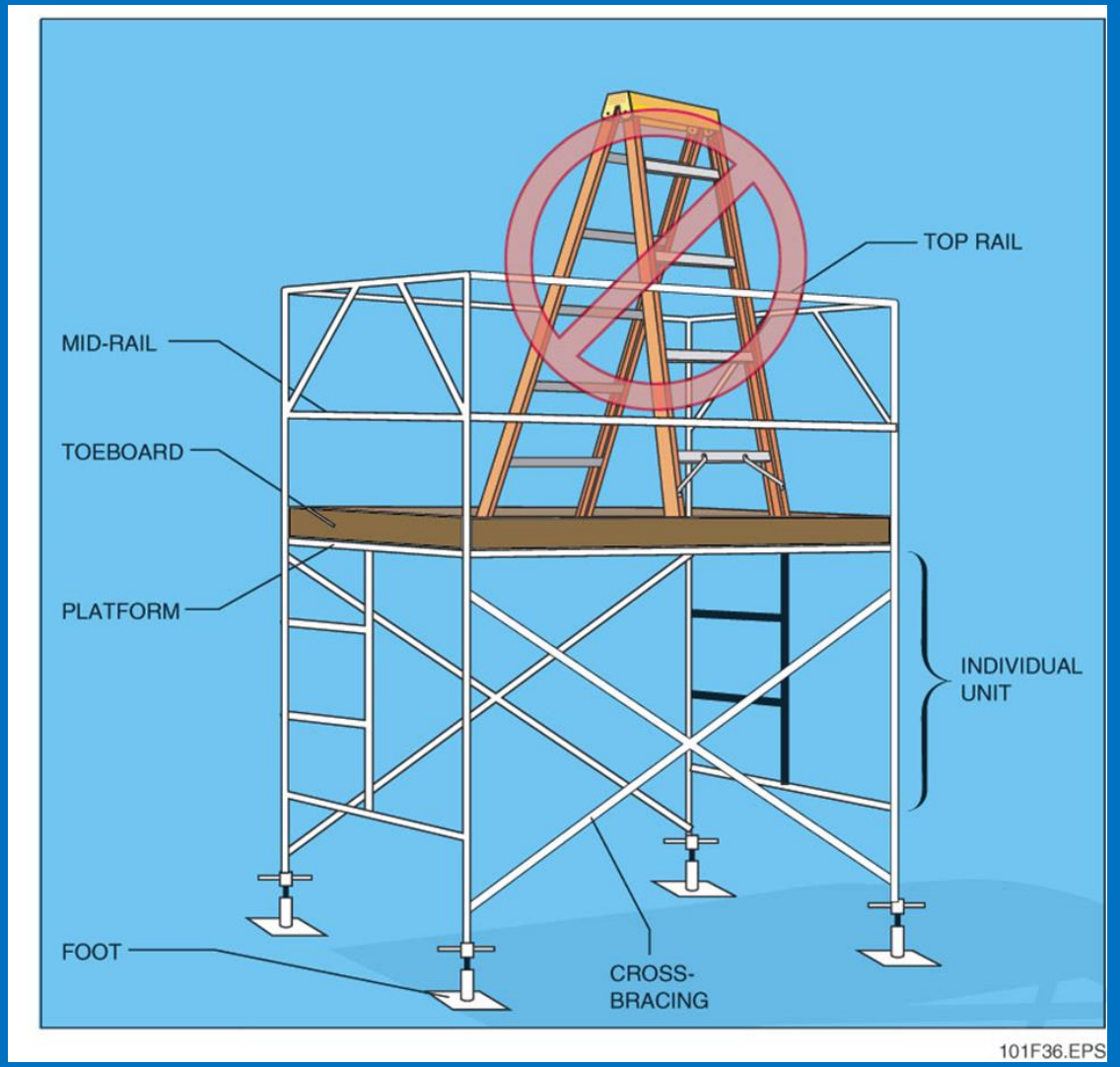
Scaffolds

- Scaffolds provide safe elevated work platforms for people and materials.

- Wear and tear or putting too much weight on them can weaken them and make them unsafe.

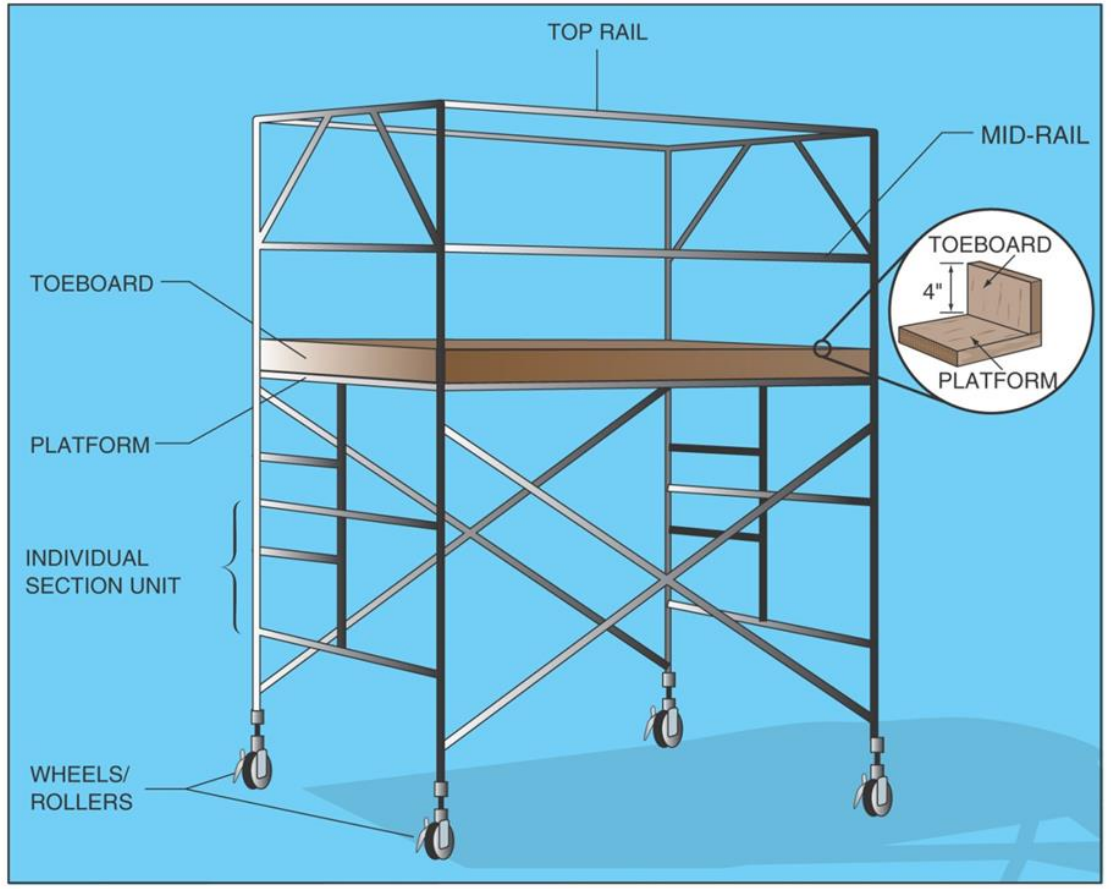
Manufactured Scaffolds

- Made of painted steel, stainless steel, or aluminum.
- Stronger and more fire resistant than wooden scaffolds.
- They are supplied in ready-made, individual units, and are assembled on site.



Rolling Scaffolds

- Has wheels on its legs so that it can be easily moved.
- The wheels have brakes so that the scaffold will not move while workers are standing on it.



Scaffold Tags

Struck-By Hazards

- Struck by accidents accounted for 18% or construction fatalities between 2003 and 2004.

- Approximately 75% of struck-by fatalities involve heavy equipment such as trucks or cranes.

Struck-By Hazards

The primary causes of struck-by accidents include the following hazards:

- Vehicle and equipment strikes
- Falling objects
- Flying objects

Vehicle and Roadway Hazards

- The most common causes of accidents involving highway workers on foot are hazards such as being run over by equipment.

- The most common cause of death for equipment operators is equipment rollover.

Vehicle and Roadway Hazards

When working near moving vehicles and equipment you should wear reflective or high-visibility vests or other suitable garments.

Operating Vehicles

- Always wear a seatbelt.
- Obey all speed limits
- If your rear vision is blocked, get a signaler to direct you.
- Every vehicle must have a backup alarm. Make sure the backup alarm works.
- Turn off engine and set brakes before leaving the vehicle.

Falling Objects

- When performing overhead work, be sure all tools, materials and equipment are secured to prevent them from falling on people below.

Falling Objects

- Use protective measures such as toeboards, debris nets, catch platforms, or canopies to catch or deflect falling objects.

Caught-In-Between Hazards

- Congested work sites, heavy equipment, and multiple trades can contribute to caught-in-between hazards.

- The primary causes of caught-in-between fatalities include trench/excavation collapse, rotating equipment and unguarded parts.

Trenching & Excavation

- An excavation is any man-made cut, cavity, trench, or depression formed by the mechanical or hand removal of earth or soil.

- A trench is an excavation that is deeper than it is wide, usually not wider than 15 feet.

http://www.youtube.com/watch?v=kUqBUJEqwKA

Hazards of excavations

- Cave-ins
- Water accumulation
- Falling objects
- Collapse of nearby structures
- Hazardous atmospheres produced by toxic gases in the soil.

Cave - Ins

- Cave-ins are the most common and deadly hazard in excavation work.
- Cave-ins occur when soil or rock falls or slides into an excavation
- Most cave-ins occur in trenches 5 to 15 feet deep and happen with little or no warning.

4 main causes of cave - ins

- Failure to properly or routinely inspect excavations
- Lack of protective systems
- Excessive weight from soil piles or machinery
- No safe means of egress/access

Soil Types

Soil type is a key factor in determining the type of protective system to make sure that the trench will be safe.

- Solid Rock is the most stable
- Sandy soil is the least stable.

Soil Types

- Solid Rock: Excavation walls stay vertical as long as the excavation is open.
- Type A Soil: Fine grained, cohesive clay, hardpan and caliche. Particles too small to see with the naked eye.
- Type B Soil: Angular rock, silt, and similar soil.
- Type C Soil: Coarse-grained, granular: sand, gravel, and loamy sand. Particles are visible to the naked eye.

Soil Types

- To be safe, treat soil as if it is Type C soil unless proven otherwise

- Its better to over-prepare for a stronger soil than to not prepare for a weaker one..

Maximum Allowable Slope

The maximum allowable slope for sloping or benching systems depends on the type of soil that is being dug.

- *Type A soil* – ¾ to 1, or 53°
- *Type B soil* – 1 to 1, or 45°
- *Type C soil* – 1 ½ to 1, or 34°

Trench Protection

- Sloping system- sides of an excavations are cut back to a safe angle using relatively smooth inclines

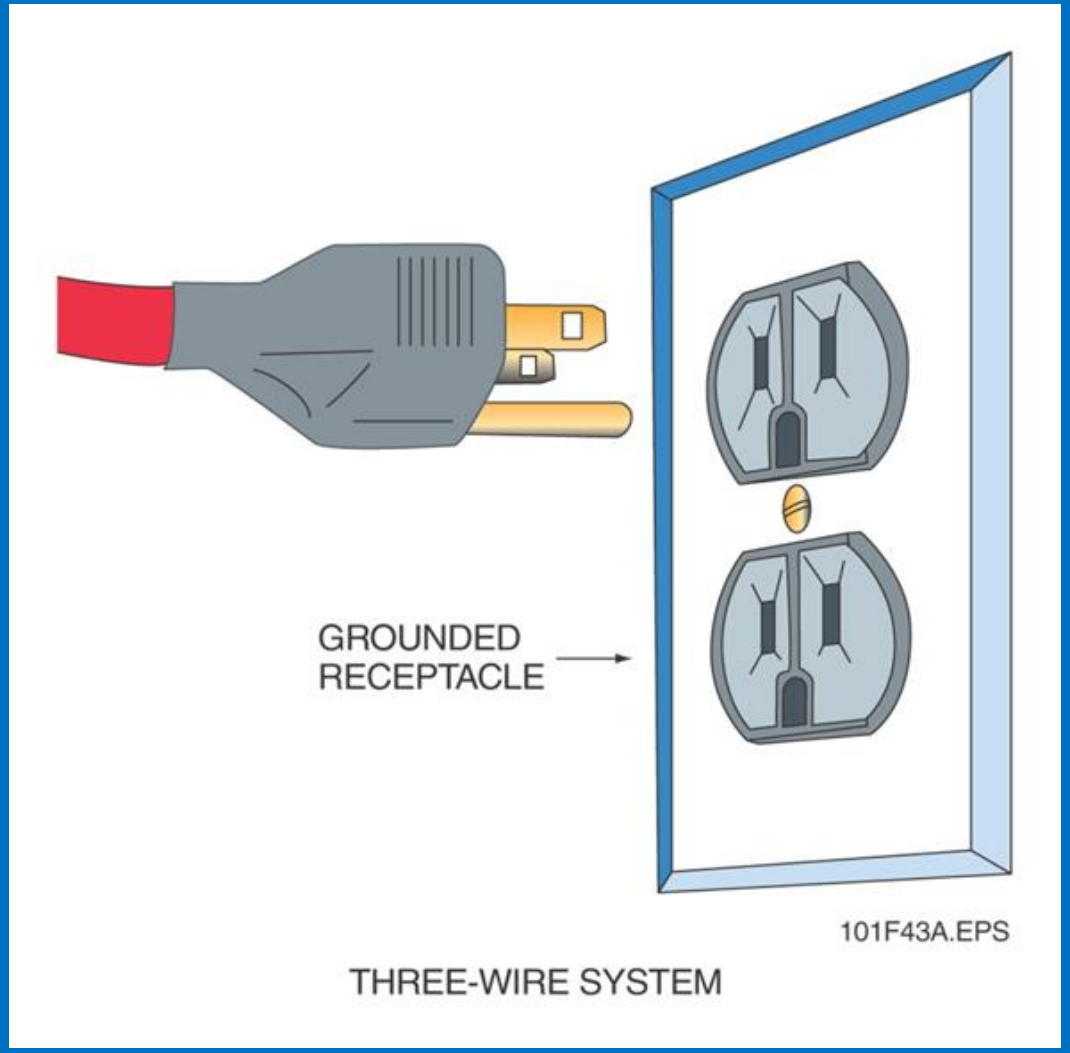
- Benching system- trench walls cut back using a series of steps. It is important to know that benching systems cannot be used in Type C soils. They will not hold the bench properly and could collapse.

Tool and Machine Guarding

Machine guards should prevent moving parts of the machine from coming into contact with your arms, hands or any part of your body.

Electrical Safety Guidelines

- Three-wire systems is one of the most common safety grounding systems used to protect you from accidental shock.
- The third wire is connected to a ground.
- If the insulation fails, the current will pass to the ground and not through your body.



THREE-WIRE SYSTEM

GFCI

- Ground Fault Circuit Interrupter
- You should use a portable GFCI, or an assured grounding program with every tool.

Lockout/Tagout

- Safeguards workers from hazardous energy while they work with machines and equipment.

Lockout/Tagout

A lockout / tagout system protects workers from hazards such as the following:

- Acids
- Air Pressure
- Chemicals
- Electricity
- Flammable liquids
- High temperatures
- Hydraulics
- Machinery
- Steam
- Other forms of energy

Personal Protective Equip.

- Personal Protective Equipment (PPE)
- When worn correctly, PPE is designed to protect you from injury.
- You must inspect it and keep it in good condition.
- Many workers are injured on the job because they are not using PPE.

Clothing and Jewelry

- Your clothing must comply with good general work and safety practices.
- Do not wear clothing or jewelry that could get caught in machinery or otherwise cause an accident.
- Ex.) Loose clothing, baggy shirts, or dragging pants. Your shirt should always be tucked in unless you are performing welding.

Hard Hats

- The outer shell can protect your head from a hard blow.
- The webbing inside keeps a space between the shell and your head.
- You should never wear anything under your hard hat.

Eye and Face Protection

- Wear eye protection whenever there is even the slightest chance of an eye injury.

- Must meet American National Standards Institute (ANSI) requirements.

Eye and Face Protection

Eye and face protection should be used during the following tasks:

- Grinding and chipping
- Using power saws and other tools that can throw out solid material.
- Working with chemicals
- Arc welding.

Arc Welding

- Welders must use tinted goggles or welding hoods.
- Tinted lenses protect the eyes from the bright welding arc or flame.
- Welders should use filter lenses of not less that No. 10 shade.
- Gas welding and burning requires the use of a filter lens of not less than a No. 4 shade.

Arc Welding

Gloves

- Gloves help prevent cuts and scrapes when you handle sharp or rough materials.
- Heat resistant-gloves are sometimes used for hot materials.
- Electricians use special rubber-insulated gloves when they work on or around live circuits.
- Electrician’s rubber insulated gloves should be inspected regularly to make sure they will protect the wearer.

Glove Inspection

- Step 1. Stretch the glove
- Step 2. To trap air inside, either twirl the glove around quickly, or roll it down from the glove gauntlet
- Step 3. Trap air inside by squeezing the gauntlet with one hand. Use the other hand to squeeze the palm, fingers, and thumb to check for weaknesses and defects.
- Step 4. Hold the glove up to your ear to try to detect any escaping air.

Leg Protection

- Overalls or pants should not have loose, torn, or dragging fabric that can become caught on objects or pose a tripping hazard.
- **Never** wear shorts on a jobsite.
- Besides the greater risk of injuries, shorts expose your skin to the sun and a number of chemicals and substances that can cause skin irritations.
- Always tape your pants into rubber boot tops when working in concrete or with chemicals.

Foot Protection

- The best shoes to wear on a construction site are ANSI-approved shoes.
- The safety toe protects your toes from falling objects.
- The steel sole keeps nails and other sharp objects from puncturing your feet.
- **Never** wear canvas shoes or sandals on a construction site

Skin Protection

- Skin is susceptible to dermatitis (skin irritation) caused by exposure to chemicals that strip oils from the skin.
- Avoid this condition by using gloves and avoiding exposure to chemicals.
- Repeated exposure to wet concrete can cause concrete burns and poisoning.
- Prevent this by wearing rubber gloves and boots when working with concrete.

Hearing Protection

- Damage to most parts of the body causes pain. But ear damage does not always cause pain.
- Exposure to loud noise over a long period of time can cause hearing loss, even if the noise is not loud enough to cause pain.
- Save your hearing by using hearing protection whenever you have to talk above normal levels.
- Clean earplugs regularly with soap and water to prevent ear infections.

101F22.EPS

Respiratory Protection

Federal law specifies which type of respirator to use for different types of hazards.

There are 4 general types of respirators.

- Self-contained breathing apparatus (SCBA)
- Supplied air mask
- Full facepiece mask with chemical canister. (gas mask)
- Half mask or mouthpiece with mechanical filter.

Respiratory Protection

- A full facepiece mask with chemical canisters is used to protect against brief exposure to dangerous gases or fumes.
- A half mask or mouth piece with mechanical filter is used in areas where you might inhale dust or solid particles.

Respiratory Protection

Self-Contained Breathing Apparatus (SCBA)

Respiratory Protection

- Supplied Air Mask

Respiratory Protection

- Full Facepiece Mask

Respiratory Protection

- Half Mask

Respiratory Protection

All respirators must be fitted properly, and their facepiece-to-face seal must checked with each use.

The following conditions will interfere with the seal.

- Facial hair (sideburns or beards)
- Skullcaps
- Temple bars on glasses (especially when wearing full-face respirators)
- Absence of upper, lower, or all teeth
- Absence of dentures
- Gum and tobacco chewing

Material Safety Data Sheets

- A MSDS sheet must accompany every shipment of a hazardous substance and must be available to you on the jobsite.

- You must use the MSDS to manage, use and dispose of hazardous materials safely.

Material Safety Data Sheets

The information found on an MSDS includes the following:

- Identity of the substance
- Exposure limits
- Physical and chemical characteristics of the substance
- Type of hazard the substance presents
- Precautions for safe handling and use
- Reactivity of the substance
- Specific control measures
- Emergency first-aid procedures
- Manufacturer contact information.

Asbestos

- Asbestos is a hazardous material that can be harmful to your lungs.
- Prolonged exposure can cause lung cancer, asbestosis (scarring of the lung tissue), and a cancer called mesothelioma.
- It may take more than 20 years for these diseases to develop.

Heat Stress

- Heat stress occurs when abnormally hot air/ or high humidity or extremely heavy exertion prevents your body from cooling itself fast enough.
- When this happens, you may suffer a heat stroke, heat exhaustion, or heat cramps.
- To prevent heat stress, take the following precautions:
- Drink plenty of water, avoid alcoholic or caffeinated drinks and do not overexert yourself.

Heat Cramps

Heat Cramps are muscular pains and spasms caused by heavy exertion. Loss of water and electrolytes from heavy sweating causes these cramps.

Symptoms of heat cramps include the following:

- Painful muscle spasms and cramping
- Pale, sweaty skin
- Normal body temperature
- Abdominal pain
- Nausea

Heat Exhaustion

- Heat exhaustion typically occurs when people exercise heavily or work in a warm, humid place.
- When its humid, sweat does not evaporate fast enough to cool the body properly.
- Heat exhaustion can escalate into heat stroke, a potentially fatal condition.

Heat Exhaustion

Symptoms of heat exhaustion include the following:

- Cool, pale, and moist skin
- Heavy sweating
- Dilated pupils
- Dizziness
- Fainting
- Fast, weak pulse
- Slight elevation of body temperature

Heat Stroke

- Heat stroke is life threatening. The body's temperature control system, which produces sweat to cool the body, stops working.

- The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

- If you suspect someone has heat stroke, call EMS immediately.

Heat Stroke

The symptoms of heat stroke include the following:

- Hot, dry, or spotted skin.
- Extremely high body temperature
- Very small pupils
- Mental confusion
- Headache
- Vision impairment
- Loss of consciousness

Welding and Cutting Hazards

- The oxygen and acetylene used in gas welding are very dangerous.
- The cylinders containing oxygen and acetylene must be transported, stored, and handled very carefully.
- Store cylinders in an upright position where they will not be struck, and where they will be away from corrosives.
- Secure cylinders so they cannot tip over or fall.

Welding and Cutting Hazards

- Never look at an arc welding operation without wearing the proper eye protection. The arc will burn your eyes.

- If you are welding, use the proper PPE

- Do not remove the protective cap unless a cylinder is secured. If the cylinder falls over or the nozzle breaks off, the cylinder will shoot off like a rocket, injuring or killing anyone in its path.

Hoses and Regulators

- The oxygen hose is green and has a right-hand threaded nut for connecting to the torch.
- The fuel or gas hose is red and has a left-hand threaded nut for connecting to the torch.
- Inspect the hoses and look for charred sections close to the torch. These may be caused by flashback, which is the result of a welding flame flaring up and charring the hose near the torch connection.
- Flashback is caused by improperly mixed fuel.