



- ▶ Electrical
Electrica
- ▶ Struck by/Caught between
Golpeado por / atrapado entre
- ▶ Falls/Scaffolding
Proteccion contra las caidas/Andamios

Masonry Safety



English y Español



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It is not the intent of RMMI to provide compliance-based training in this presentation, the intent is more to address Focus Four hazard awareness in the masonry construction industry, and to recognize the overlapping hazards present in many construction workplaces.

It is the responsibility of the employer, its subcontractors, and its employees to comply with all pertinent rules and regulations in the jurisdiction in which they work. Copies of all OSHA regulations are available from www.OSHA.gov. This booklet is intended to discuss Federal Regulations only. If this training is held in a state that is operating under an OSHA-approved State Plan, State OSHA requirements for that state must be included in the training. It is assumed that individuals using this presentation or content to augment their training programs will be "qualified" to do so.



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MASONRY
INSTITUTE

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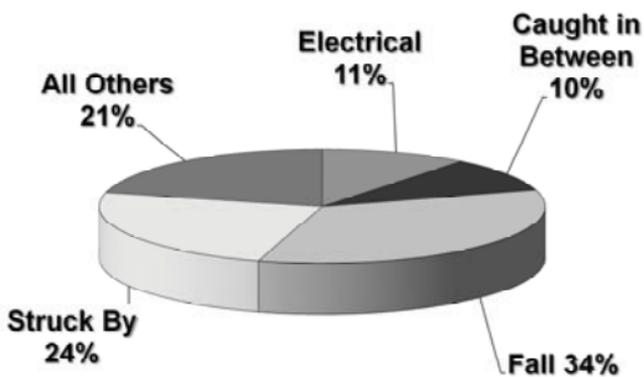
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COMPETENT PERSON

A person who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.



Electrical Safety for Masonry



Electrical Safety for Masonry

Electricity is the second leading cause of death in construction. Take your safety seriously when dealing with electricity.



Leading Causes of Electrical Accidents:

- Drilling and cutting through cables
- Using defective tools, cables and equipment
- Failure to maintain clearance distance of 10"
- Failure to de-energize circuits and follow Lockout/Tagout procedures
- Failure to guard live parts from accidental worker contact
- Unqualified employees working with electricity
- Improper installation/use of temporary electrical systems and equipment
- By-passing electrical protective devices
- Not using Ground Fault Circuit Interrupter devices
- Missing ground prongs on extension cords

Electrical Safety for Masonry

Hazards of Electricity

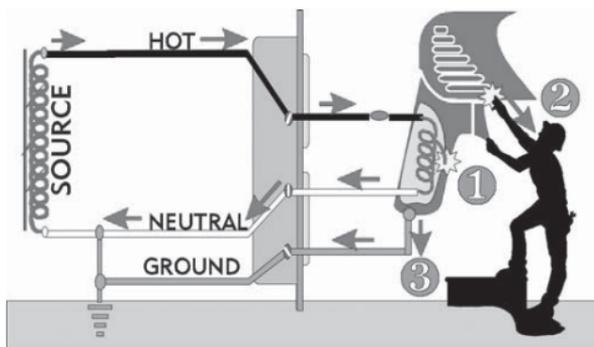
- Shock – Most common and can cause electrocution or muscle contraction leading to secondary injury from falls
- Fires – Enough heat or sparks can ignite combustible materials
- Explosions – Electrical spark can ignite vapors in the air
- Arc Flash - can cause burns ranging from 14,000 degrees f. to 35,000 degrees f.
- Arc Blast - In a short circuit event sopper can expand 67,000 times. The expansion causes a pressure wave. Air also expands adding to the pressure wave.



Electrical Safety for Masonry

Current Flows in a Loop or Circuit

- Circuits are AC (alternating current) or DC (direct current).
- Current is usually AC.
- AC current has five parts:
 - Electrical source
 - HOT wire to the tool.
 - The tool itself
 - NEUTRAL wire returns electricity from the tool
 - GROUND



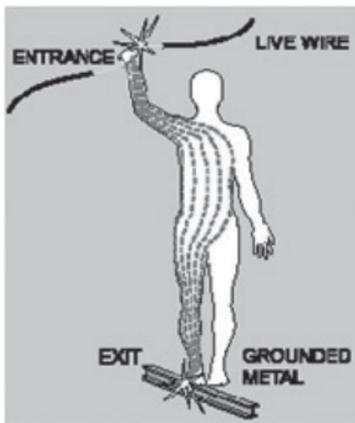
How Shocks Occur:

- 1.Current travels in closed circuits through conductors (water, metal, the human body).
- 2.Shock occurs when the body becomes a part of the circuit.
- 3.Current enters at one point & leaves at another.

Electrical Safety for Masonry

Shocks Occur in Three Ways

1. Contact with both conductors
2. Contact with one conductor and ground
3. Contact with a tool: contact with "hot" metal part and ground



Severity of the Shock depends on:

- Amount of current
- Determined by voltage and resistance to flow
- Path through the body
- Duration of flow through the body
- Other factors such as general health and individual differences.



Electrical Safety for Masonry

Employers must follow the **OSHA
Electrical Standards (Subpart K)**



Subpart K includes four proactive methods:

- Electrical Isolation
- Equipment Grounding
- Circuit Interruption
- Safe Work Practices





Electrical Safety for Masonry

Keep electricity away by:

Insulating the conductors

- Rubber and plastic is put on wires to prevent shock, fires, short circuits and strain relief.
- It is always necessary to check the insulation on equipment and cords before plugging them in.
- Even the smallest defect will allow leakage.

Elevating the conductors

- Wires are often elevated by the power company.
- It is always necessary to check the location of overhead lines before you begin work each day.
- Never allow yourself, your tools, or the materials you are working with to be within 10 feet of energized lines.

Enclosing the conductors

- Covers, boxes, and enclosures are often put around conductors to prevent worker contact.
- It is always necessary to check that electrical boxes and panels are covered and free from missing “knock-outs”.
- Electric equipment operating at 50 volts or more must be guarded.



Electrical Safety for Masonry

Ground the equipment



Provide a separate, low resistance pathway for electricity when it does not follow normal flow. Grounding gives the stray current somewhere to go and keeps you from becoming part of the circuit.



Grounding will not work if the electricity can flow through you more easily than the ground. This can happen when:

- Your tool doesn't have a ground pin.
- You're working in wet locations.
- You're touching a metal object.



What must be grounded?

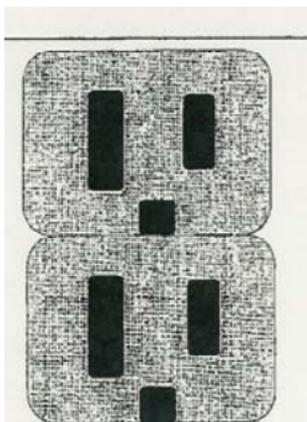
- All circuits and extension cords.
- All noncurrent carrying metal parts.
- Portable & semi-portable tools and equipment unless double insulated, and portable generators if more than 5 kV.

Electrical Safety for Masonry

Do not eliminate the ground



Do not reverse polarity



Electrical Safety for Masonry

Automatically shut off the flow of electricity in the event of leakage, overload, or short circuit.

Circuit breakers & fuses protect equipment, not the worker, because they take too much current and too much time to trip.

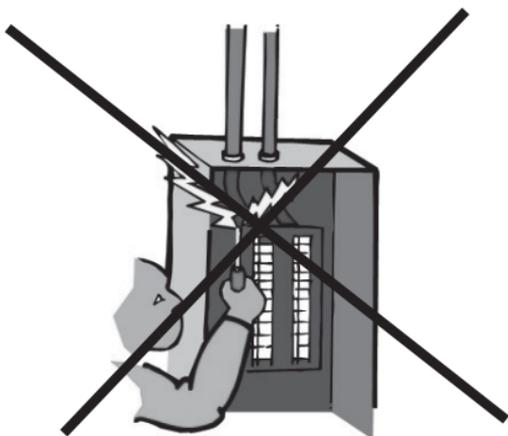


Electrical Safety for Masonry

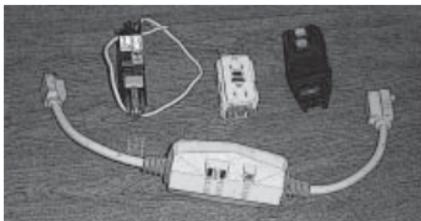
Circuit Breakers and Fuses only protect the building, equipment, and tools from heat build-up.



Never depend on circuit breakers or fuses to prevent shocks.



Ground Fault Circuit Interrupter (GFCI) is the only device which will protect the worker from shock and electrocution.



Electrical Safety for Masonry

All temporary circuits are required to have **GFCI** protection or:

- Equipment & cords must be included in an Assured Equipment Grounding Conductor Program

An extension cord is a temporary circuit. There are three types:

- receptacle,
- circuit breaker
- portable



Extension cords must be wired correctly and tested.

The **GFCI** detects 'leakage' of 4-6 milliamps & opens the circuit in 1/40th of a second. It will work without the ground plug but not fast enough if you are the ground.

A 220V **GFCI** breaker must be installed to protect workers using **masonry saws**.

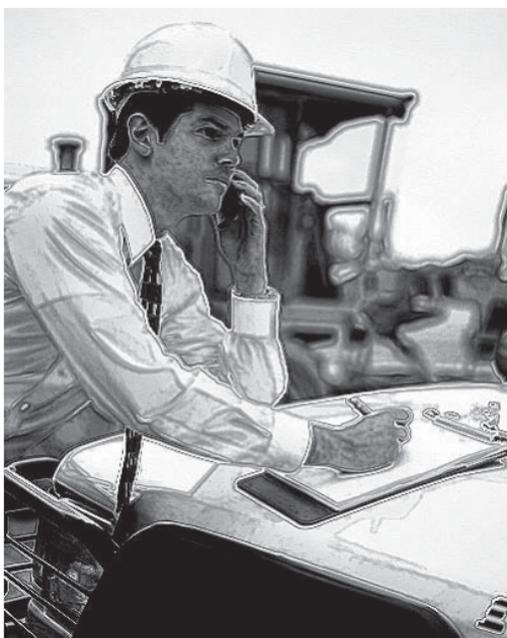


Electrical Safety for Masonry

An **Assured Equipment Grounding Conductor Program** requires:

- Written program and specific procedures
- Program implemented by a Competent Person
- Equipment grounding conductors must be tested (tools, extension cords, and circuits) at least every three months for cords & tools and at least every six months for receptacles.

The results must be recorded and the equipment coded with colored tape.



Electrical Safety for Masonry

Extension Cords and Cables

Must be in good shape without splices. Cords cannot be secured with staples, nails or bare wire. They must be protected from damage and they must have a ground pin. All extension cords and cables should be inspected regularly and pulled from service if defective.

Cords cannot be repaired with electrical or duct tape. They must be repaired with heat-shrink sleeve or bonding/vulcanizing tape to retain original insulation properties.

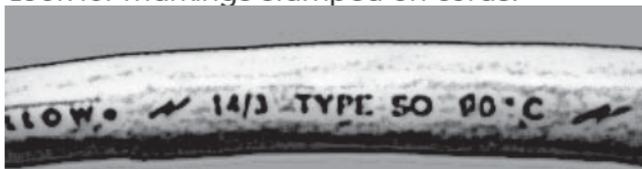


No flat cords allowed on construction sites

Acceptable Cord Types

All cords must meet the National Electric Code's (NEC) requirement for Hard/Extra Hard type.

Look for markings stamped on cords.



Acceptable Cord Types

Extra Hard Use Markings: S, ST, SO, STO

Hard Usage Markings: SJ, SJO, SJT, SJTO



Electrical Safety for Masonry

Temporary Wiring

There must be separate circuits for electric tools and lighting, each labeled as such.

Light circuits do not require a GFCI unless used in a wet location.

- Test branch circuits before use.
- Maintain vertical clearances.
- Insulate wires from their supports.



Temporary lighting

All bulbs must be guarded

No broken bulbs or empty sockets

Not suspended by wiring

Low voltage for wet locations



Portable generators

The frame of the portable generator need not be grounded if the generator supplies only cord and plug connected equipment or the non-current carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame. Refer to the generator's owners manual to determine specific grounding requirements.

GFCI is required if >5kV



Electrical Safety for Masonry

Safe Work Practices

Before work begins, the employer must determine where exposed and concealed electrical circuits are located. Once found, warning signs/labels must be posted. Workers need to know the location, hazards, and protective measures.

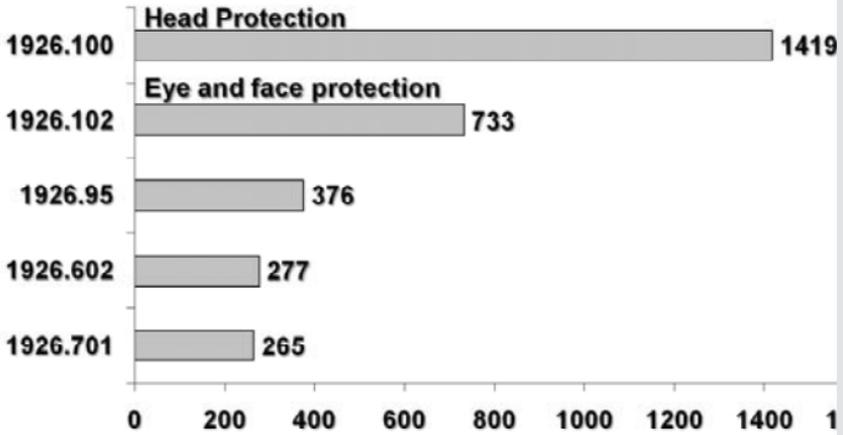
A Competent Person must determine if performance of work could bring contact with energy. Distance of the worker to the energy source should be considered first.

Tools, materials, and processes should also be considered to see if they could potentially shorten the safe separation distance.

No work near electric circuits unless the worker is protected by de-energizing the circuit and grounding it, guarding it effectively by insulation or other means maintaining safe separation. De-energized circuits and equipment must be locked/tagged out.

- No metal ladders for or near electrical work.
- No wet hands when plugging or unplugging cords/equipment.
- No raising or lowering tools by the cord.
- No using equipment in damp and wet locations, unless it is designed for that purpose.

Struck-by Prevention for Masonry



Struck-by Prevention for Masonry

- Hardhats, as well as other personal protective equipment (PPE), must be provided by the employer: hardhats, safety glasses, hearing protection, respiratory protection.



- Employees must be trained on the use of PPE and be required to use it

Struck-by Prevention for Masonry

Primary causes of struck-by fatalities

- Falling Objects
- Rigging Failure
- Loose or Shifting Materials
- Equipment Tipover or Malfunction
- Lack of Overhead Protection



Vehicle and Equipment Strikes

- Backing Incidents
- Workers on Foot

Struck-by Prevention for Masonry

Rigging Failure

- Inspect all rigging
- Slings must be inspected before each use
- Slings should have tags with capacities, inspection requirements, service dates, etc.
- The information on all tags must be readable!
- DO NOT use makeshift devices for lifting any material

Slings and other lifting devices must be properly stored.

- Hang them up in a dry place.
- Never allow them to lay on the ground or floor where damage can occur.



Struck-by Prevention for Masonry

Loose or Shifting Materials

All material should be properly stacked to ensure stability



Struck-by Prevention for Masonry

Overhead Protection

Protection from overhead hazards must be provided and required at all times



- A limited access zone should be erected below all lifting operations
No one should be allowed in this area while lifts are being made
- A canopy structure can be built to protect workers and pedestrians below and behind the scaffold.
- Debris nets may also be used to catch material before it falls to the ground below.

Struck-by Prevention for Masonry

Lack of Overhead Protection

No worker may ever work under a suspended load. This includes loads handled by forklifts.



Always pay attention to warning signs.

Always secure cylinders to prevent them from falling over.

Struck-by Prevention for Masonry

Backing Incidents

Forklift loads limit the operator's forward view. Operators cannot be out of the seat with a raised load. The equipment configuration can make it difficult to see behind the forklift as well.



Struck-by Prevention for Masonry

Workers on foot

Always use a flagger when the operator does not have a clear view of their path of travel. Most local and state laws require a flagger when construction equipment uses public streets or highways. Most states require flaggers to complete a class that teaches basic procedures and safety rules. Check the traffic control and flagger certification requirements for your area.



Struck-by Prevention for Masonry

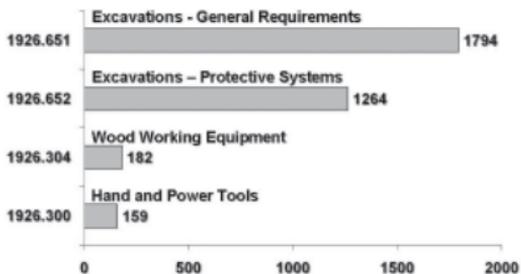
OSHA requires all workers to wear reflectorized vests when working near vehicular traffic.



There are different types of vests for specific working conditions . Your supervisor or competent person will ensure you are using the correct type for the work you are doing.

Caught Between Hazards in Masonry

Top Caught-in-Between Citations





Caught Between Hazards in Masonry

Rotating/Unguarded Equipment

- Mixers represent a hazard due to their rotating parts. NEVER put any part of your body inside a running mixer. Mixers weigh between 300-600 lbs. Never operate a mixer unless the motor cover is closed.
- Place all masonry saws on a stable, level surface. When operating a masonry saw use the correct PPE and never put your hands where they can contact the rotating blade.
- Hand-held equipment, such as a demo saw, can kick back. Always hold firmly with both hands and follow the manufacturer's guidance. Never disable any guard or protective device on your equipment.





Caught Between Hazards in Masonry

Equipment Operation/Maintenance

- Only trained and certified employees are allowed to operate forklifts. Always wear your seatbelt when operating equipment. You must stay in the vehicle to survive if it rolls over.
- Never be in a position where an equipment operator cannot see you
- Never be in a position where equipment can crush or kill you! Follow the manufacturer's guidance when performing maintenance
- Ensure the backup alarm is working on all equipment.
- When unloading trailers always watch for shifting material as well as overhead loads.
- When moving scaffolding with a forklift, use a spotter since the operator's view is

Caught Between Hazards in Masonry

Loading/Unloading Equipment

- Make sure the trailer is secure and on a level surface. Inspect the deck for debris, blocking or chains. Have a spotter help properly align the equipment up/down the ramps.



- Be sure equipment is properly secured
- Working in darkness creates other hazards such as reduced visibility. Keep the area well lit and make sure the operator can see everyone

Caught Between Hazards in Masonry

Excavations

All excavations must be inspected by a competent person each day prior to the start of work and as needed throughout the day.

When masonry work is done below grade, you must comply with OSHA requirements for working in excavations. The excavation must be properly sloped or benched to provide the required employee protection.







Fall Prevention for Masonry

General Fall Protection



General Fall Protection

General fall protection is required when working above 6 feet in construction. When working on a silo, ensure guardrail chains are closed



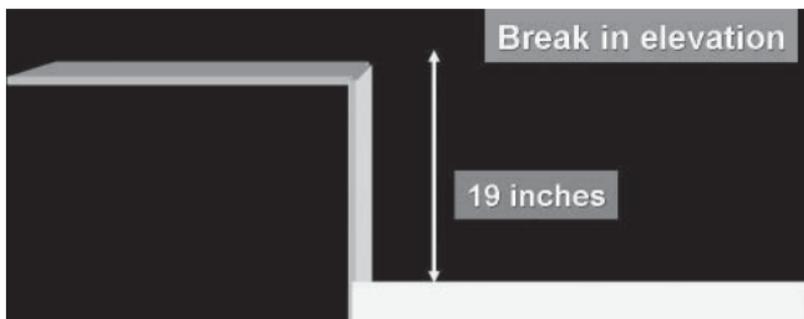
When masonry work must be done on a roof or other elevated surface, a guardrail system must be installed or a Personal Fall Arrest system must be used above 6 feet.



General Fall Protection

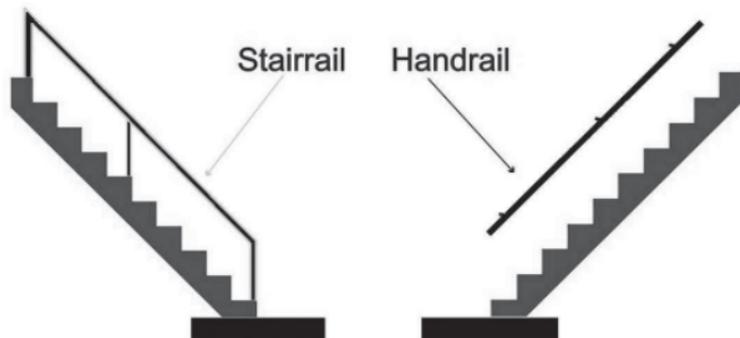
On a construction site, floor holes greater than 2 inches in any dimension must be covered or guarded. If covered, the cover must be marked and secured as such.

There must be a stairway or ladder at points of access where there is an elevation break of 19 inches or more. At least one point of access must be kept clear



General Fall Protection

Stairways with four or more risers or more than 30 inches high must have a stair rail along each unprotected side or edge and have at least one handrail



Stair rails must be able to withstand a force of 200 pounds outward and downward along its entire length

Only use pan stairs if filled with filler material at least to the top edge of each pan, has stair rails/ handrails installed and the unprotected sides of landings have a standard 42 inch guardrail system.

Fall Prevention for Masonry

Scaffolding



29 CFR 1926 Subparts L & M



Scaffolding Fall Prevention

Each employer must have a competent person determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds at each jobsite.



A Competent Person one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. This individual determines if it's safe to work on a scaffold during storms or high winds. He or she trains workers to recognize hazards and selects qualified workers to conduct work. Competent person inspects scaffolds for visible defects before each shift and after any alterations or unusual occurrences.

For each jobsite, the employer must train all employees involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold. The training must be done by a competent person to recognize any hazards associated with the work in question.



Scaffolding Fall Prevention



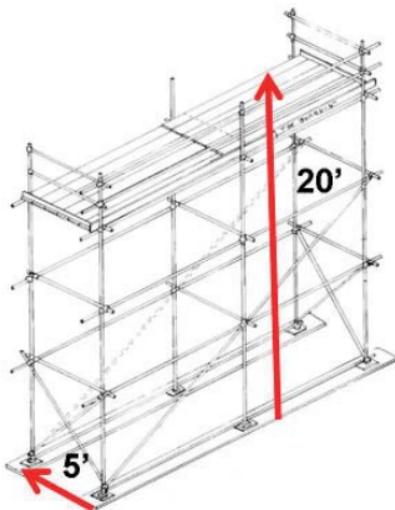
Inspect all scaffold components prior to erecting scaffold. Look for bent frames and cross braces, broken pins, damaged planks, etc. Component pieces used must match and be of the same type.

- Place supported scaffold poles, legs, posts, frames, and uprights on base plates and mud sills or other adequate foundations. Erect the scaffolding on stable and level ground. Lock wheels and braces. Where uplift can occur, pin scaffold frames together.
 - Use scaffold grade wood for platforms. The wood may not be painted.
 - Install ladders as soon as scaffold erection has progressed to a point that permits safe installation and use.
 - Install guard-rail systems before the scaffold is released for use by employees other than the erection crews.
 - Wear a harness/lanyard while erecting or dismantling scaffolding.
- 

Scaffolding Fall Prevention

Platforms

The height of the scaffold should not be more than four times its minimum base dimension unless guys, ties, or braces are used.



Install platforms so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide, except where the employer can demonstrate that a wider space is necessary.



Scaffolding Fall Prevention

Platforms

- Extend each end of a planked deck over the centerline of its support at least 6 inches but not more than 12 inches, unless it is cleated or otherwise secured by hooks.
 - Overlap planks over supports. The overlap must be 12 inches or more unless the platforms are nailed together or otherwise restrained to prevent movement.
 - Use ladders, stair towers, ramps or similar structures when scaffold platforms are more than 2 feet above or below a point of access. Walkways, integral prefabricated scaffold access, or direct access from another scaffold, structure, personnel hoist, or similar surface is also acceptable.
 - Place the front edge of platforms 14 inches or less from the face of the work, unless guard-rail systems are erected along the front edge and/or personal fall arrest systems are used.
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Scaffolding Fall Prevention

Ladders

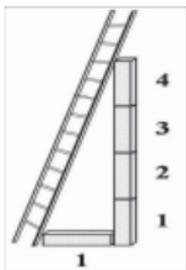
Hook-on and attachable ladders shall have a minimum rung length of 11 1/2 inches and have uniformly spaced rungs with a maximum spacing between rungs of 16 3/4 inches.



Check that all rungs are intact and free from grease or oil

- Inspect ladder for visible defects, dents or bent areas.
- Verify that all braces are secure

Use the 4 to 1 rule: Set the ladder 1 foot out for every 4 feet up to the point of support.



Extend all ladders 36 inches above the landing and tie or otherwise secure the base of the ladder and anchor the top

Scaffolding Fall Prevention

Ladders

 LOAD CAPACITY 375 lbs. Special Duty Professional Use Type IAA DUTY RATING	 LOAD CAPACITY 300 lbs. Extra Heavy Duty Professional Use Type IA DUTY RATING	 LOAD CAPACITY 250 lbs. Heavy Duty Industrial Use Type I DUTY RATING	 LOAD CAPACITY 225 lbs. Medium Duty Commercial Use Type II DUTY RATING	 LOAD CAPACITY 200 lbs. Light Duty Household Use Type III DUTY RATING
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Choose the correct type of portable ladder:

- Type IAA Special Duty up to 375 lbs.
- Type IA Heavy Duty up to 300 lbs.
- Type I ladders up to 250 lbs.
- Type II ladders up to 225lbs.*
- Type III ladders (light duty) up to 200lbs*

Do Not use Cross braces on tubular welded frame scaffolds as a means of access or egress, even by erectors building or dismantling the scaffold.

* Type II and III ladders are not acceptable for construction use

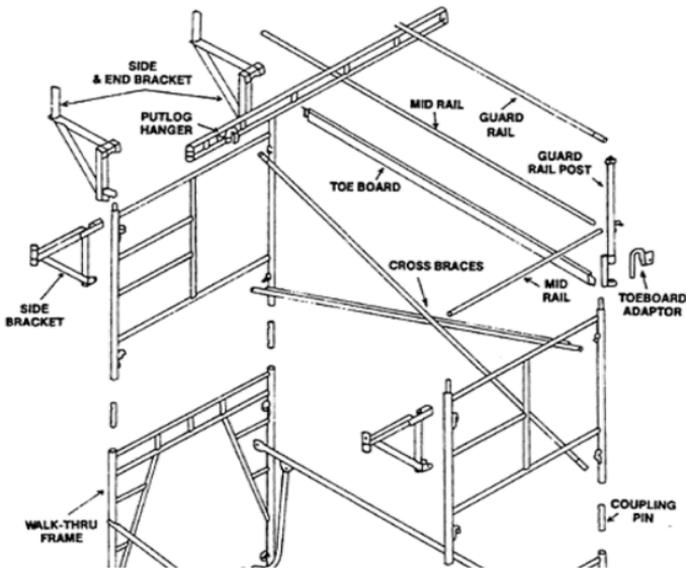
Scaffolding Fall Prevention

Stair towers must have stairrails/handrails as well as guardrails on the open sides of all landings.



Scaffolding Fall Prevention

Integral prefabricated scaffold access frames must be specifically designed and constructed for use as ladder rungs and have a rung length of at least 8 inches.



Scaffolding Fall Prevention

Guardrails

Install Guardrails (38" - 45" above the deck) on the open sides and ends of each working level when it is 10 feet or more above a lower surface. Each top rail must withstand, without failure, a force of at least 200 pounds applied in any downward or horizontal direction at any point along its' top edge.



Install Mid rails, screens, etc. of a guardrail system midway between the top rail and the deck. They should withstand, without failure, at least 150 pounds.

Cross bracing is acceptable in place of a midrail when the crossing point of the two braces is 20" - 30" above the work platform or as a top rail when the crossing point of the two braces is 38" - 48" above the work platform.

Scaffolding Fall Prevention

Guardrails

- Be sure Guardrails do not injure an employee from punctures or lacerations, and that they have a smooth surface to prevent snagging of clothing
- Provide Fall protection at the exposed ends of the walk planks as well as openings in front of the workers



Do Not use Makeshift devices, such as, but not limited to, ladders, boxes and barrels, on top of scaffold platforms to increase the working level height of employees

Do Not use shore, lean-to or makeshift scaffolds

Scaffolding Fall Prevention

Employees may not work on scaffolds with snow, ice, or other slippery material except as necessary for removal of such materials. Do not work on scaffolds during storms or high winds.





Fall Prevention for Masonry

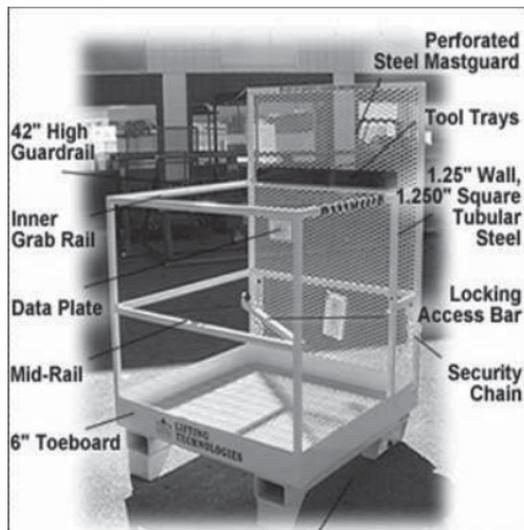
Lifts



Lifts Fall Prevention

Using a forklift as an aerial lift can only be done when two requirements are met:

- The forklift manufacturer approves the use of their equipment for such purposes
- An engineered/approved platform meeting the OSHA requirements for fall protection is used





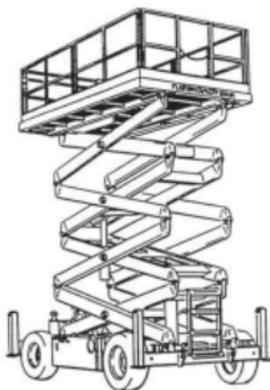
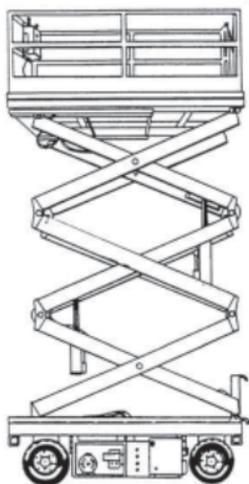
Lifts Fall Prevention

The following requirements must be met as well:

1. The work platform must be equipped with standard guardrails and must be firmly secured to the lifting carriage or forks.
 2. The hydraulic system must be designed such that the lift mechanism will not drop faster than 135 feet per minute in the event of a failure in any part of the system.
 3. The operator must be in the driving seat while workers are on the platform.
 4. The operator must be in the driving seat while raising or lowering the platform.
 5. The area between the personnel on the platform and the mast must be guarded to prevent contact with chains or other pinch points.
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Lifts Fall Prevention

When working in a straight up and down scissors type lift, a harness/lanyard is not required unless your work requires you to reach outside of the guardrail system



**SCISSOR LIFT
AERIAL WORK PLATFORM**

Lifts Fall Prevention

When using extensible and articulating boom platforms a harness shall be worn and a lanyard attached to the boom or basket when working from the lift. Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position

