



LAYHER SCAFFOLDING INSPECTION



SCAFFOLDING INSPECTION TRAINING

INTRODUCTION

This course will give learners the knowledge of components of a scaffold, the purpose they serve in ensuring its stability and the requirements of a scaffold inspection.



OVERVIEW - AGENDA

- ❑ Introduction to Scaffolds
- ❑ Scaffolding Terms
- ❑ Scaffolding Users
- ❑ Scaffolding Assembly
- ❑ Safety During Use
- ❑ Scaffolding Inspection

INTRODUCTION TO SCAFFOLDS



LEARNING OBJECTIVES

At the end of this module participants should be able to:

- ❑ Explain what is a scaffolding;
- ❑ List the different type of scaffolding.

INTRODUCTION TO SCAFFOLDS

➤ Introduction

- ❑ Scaffolding can give people an efficient and safe means to perform work.
- ❑ It also has many applications.
- ❑ Scaffolding is used in construction, alteration, routine maintenance, and renovation.
- ❑ When properly erected and maintained, scaffolding provides workers a safe access to work areas, level and stable working platforms, and temporary storage for tools and materials.



INTRODUCTION TO SCAFFOLDS

➤ Introduction

- ❑ However, unsafe scaffolding procedures can cause accidents, serious injuries and even death.
- ❑ Accidents involving scaffolding mainly involve workers falling, incorrect operating procedures, environmental conditions, and falling materials.



INTRODUCTION TO SCAFFOLDS

➤ Introduction

- ❑ When scaffolds are not erected or used properly, fall hazards can occur.
- ❑ About 2.3 million construction workers frequently work on scaffolds.
- ❑ Protecting these workers from scaffold- related accidents would prevent an estimated 4,500 injuries and 50 fatalities each year.



INTRODUCTION TO SCAFFOLDS

➤ What is a Scaffold?

❑ A scaffold is defined as an elevated, temporary work platform. There are five basic types of scaffolds:

- ❖ Supported scaffolds;
- ❖ Suspended scaffolds;
- ❖ Mobile scaffolds;
- ❖ Multi-Level
- ❖ Other scaffolds.



INTRODUCTION TO SCAFFOLDS

➤ Supported scaffolds

- ❑ Consist of one or more platforms supported by rigid, load-bearing members, such as poles, legs, frames, outriggers, etc.



INTRODUCTION TO SCAFFOLDS

➤ Suspended scaffolds

- ❑ One or more platforms suspended by ropes or other non-rigid, overhead support



INTRODUCTION TO SCAFFOLDS

➤ Mobile Scaffolds

- ❑ Mobile scaffolds are a type of supported scaffold set on wheels or casters.
- ❑ They are designed to be easily moved and are commonly used for things like painting and plastering, where workers must frequently change position.



INTRODUCTION TO SCAFFOLDS

➤ Multi-Level

- ❑ A multi-level scaffold is a two-point or multi-point adjustable suspension scaffold with a series of platforms at various levels resting on common stirrups.



INTRODUCTION TO SCAFFOLDS

➤ Other scaffolds

- ❑ Principally man lifts, personnel hoists, etc., which are sometimes thought of as vehicles or machinery, but can be regarded as another type of supported scaffold.



INTRODUCTION TO SCAFFOLDS

➤ Tube and Coupler

- ❑ Tube and coupler scaffolds are so-named because they are built from tubing connected by coupling devices.
- ❑ Due to their strength, they are frequently used where heavy loads need to be carried, or where multiple platforms must reach several stories high.
- ❑ Their versatility, which enables them to be assembled in multiple directions in a variety of settings, also makes them hard to build correctly.



SCAFFOLDING TERMS



LEARNING OBJECTIVES

At the end of this module participants should be able to:

- Explain what are the scaffolding terms;

SCAFFOLDING TERMS

➤ Introduction

- ❑ It's important to know some of the common terms when dealing with scaffolding.
- ❑ For example, when an employee goes from one job site to another, knowing the proper scaffolding terms will improve communications and safety.
- ❑ Here are the definitions for the most common terms, according to ANSI/ASSE A10.8-2011: Scaffolding Safety Requirements:



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Anchorage:** A secure point of attachment for lifelines, lanyard, deceleration devices or tiebacks.
- ❖ **Base Plate:** A device used to distribute vertical load.
- ❖ **Bearer:** A horizontal member of a scaffold upon which the platform unit rests and that may be supported by runners.
- ❖ **Boatswains' Chair:** A suspended seat designed to accommodate one worker in a sitting position.



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Body Harness, Full:** Straps that are secured about an employee in a manner that distributes the arresting forces over at least the thighs, shoulders and pelvis with provisions for attaching a lanyard, lifeline or deceleration device.
- ❖ **Brace:** A device that holds one scaffold member in a fixed position with respect to another member.
- ❖ **Competent Person:** One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate such hazards.



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Crossbraces:** Two diagonal scaffold members joined at their center to form an “X.” Used between frames or uprights or both.
- ❖ **Design Load:** The maximum intended load; that is, the total of all loads including the worker(s), material and the equipment placed on the unit.
- ❖ **Electrical Ground:** A conducting connection between an electrical circuit or equipment and the area, or some conducting body that serves in place of the earth.
- ❖ **Fall Protection:** A system designed to prevent or arrest a person’s fall.



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Guardrail System:** A rail system erected along the open sides and ends of platforms. The rail system consists of a toprail and midrail and their supports.
- ❖ **Guy:** A rope, chain or cable used to stabilize a vertical object.
- ❖ **Hoist:** A device intended to be used to raise and lower a suspended scaffold. It may be either manually operated or power-operated.
- ❖ **Lanyard:** A flexible line to secure the wearer of a full body harness to a lifeline, trolley line or a fixed anchor.



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Maximum Intended Load:** The total load of all workers, equipment, tools and materials.
- ❖ **Midrail:** A rail approximately midway between the toprail and platform of a guardrail system.
- ❖ **Open Sides and Ends:** That portion of a scaffold platform unit that is not protected by a guardrail system, crossbraces, vertical work surfaces or stirrups.
- ❖ **Personal Fall Arrest System:** An assembly of components and subsystems used to arrest a person in a fall from a working height.



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Plank:** A wood board and fabricated component that serves as a platform unit.
- ❖ **Plank (Metal):** A metal platform unit sized to support one or more workers or uniformly distributed loads. Metal planks would be similar dimensions as wood planks.
- ❖ **Plank (Wood, Laminated):** A platform unit of glue-laminated wood whose method of manufacture and assigned design values contemplate flat use in a scaffolding application.
- ❖ **Plank (Wood, Sawn):** A board of sawn lumber whose grading rules and assigned design values contemplate flat use in a scaffolding application.



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Platform:** A general term for an elevated work surface composed of one or more platform units.
- ❖ **Rated Load:** The manufacturer's recommended maximum load.
- ❖ **Qualified Person:** One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training or experience has successfully demonstrated the ability to solve or resolve problems related to the subject matter, the work or the project.
- ❖ **Runner:** A horizontal scaffold member that forms a tie between posts and may also support a bearer.



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Safety Screen:** A wire or plastic screening that protects the workers and passers-by below from dropped items.
- ❖ **Scaffold:** A temporary elevated or suspended work unit and its supporting structure used for supporting worker(s) or materials, or both.
- ❖ **Sill:** A footing (usually wood) which distributes the vertical loads to the ground or slab below.
- ❖ **Tie:** A device used between scaffold component and the building or structure to enhance lateral stability.



SCAFFOLDING TERMS

➤ Introduction

- ❖ **Toeboard:** A barrier secured along the sides and the ends of a platform unit to guard against the falling of material, tools and other loose objects.
- ❖ **Toprail:** The uppermost horizontal rail of a guardrail system.
- ❖ **Working Load:** Load imposed by persons, materials and equipment.



SCAFFOLDING USERS



LEARNING OBJECTIVES

At the end of this module participants should be able to:

- ❑ Explain what is the difference between erectors/dismantlers and users;

SCAFFOLDING USERS

➤ Scaffolding Users

- ❑ Workers on scaffolds can be divided into two groups, erectors/dismantlers and users:



SCAFFOLDING USERS

➤ Scaffolding Users

☐ Erectors/Dismantlers

- ❖ Erectors and dismantlers are those workers who are mainly responsible for assembling and disassembling scaffolding.
- ❖ This is done before other work can continue, and/or after work has been completed.



SCAFFOLDING USERS

➤ Scaffolding Users

☐ Users

- ❖ Scaffold users are those whose work requires them, at least some of the time, to be supported by scaffolding.
- ❖ Employers are required to have a qualified person provide training to each employee who uses the scaffold.



SCAFFOLDING ASSEMBLY



LEARNING OBJECTIVES

At the end of this module participants should be able to:

- ❑ Discuss about how to assembly a scaffolding in a safe manner;

SCAFFOLDING ASSEMBLY

➤ Only trained and authorized personnel may:

- ❑ Build scaffolds;
- ❑ Work on scaffolds;
- ❑ Perform inspection.



SCAFFOLDING ASSEMBLY

- Trained personnel shall:
 - ❑ Inspect scaffolding and components prior to each work shift;
 - ❑ Evaluate connections to support load and prevent swaying;
 - ❑ Determine structural soundness;
 - ❑ Recognize work hazards;



SCAFFOLDING ASSEMBLY

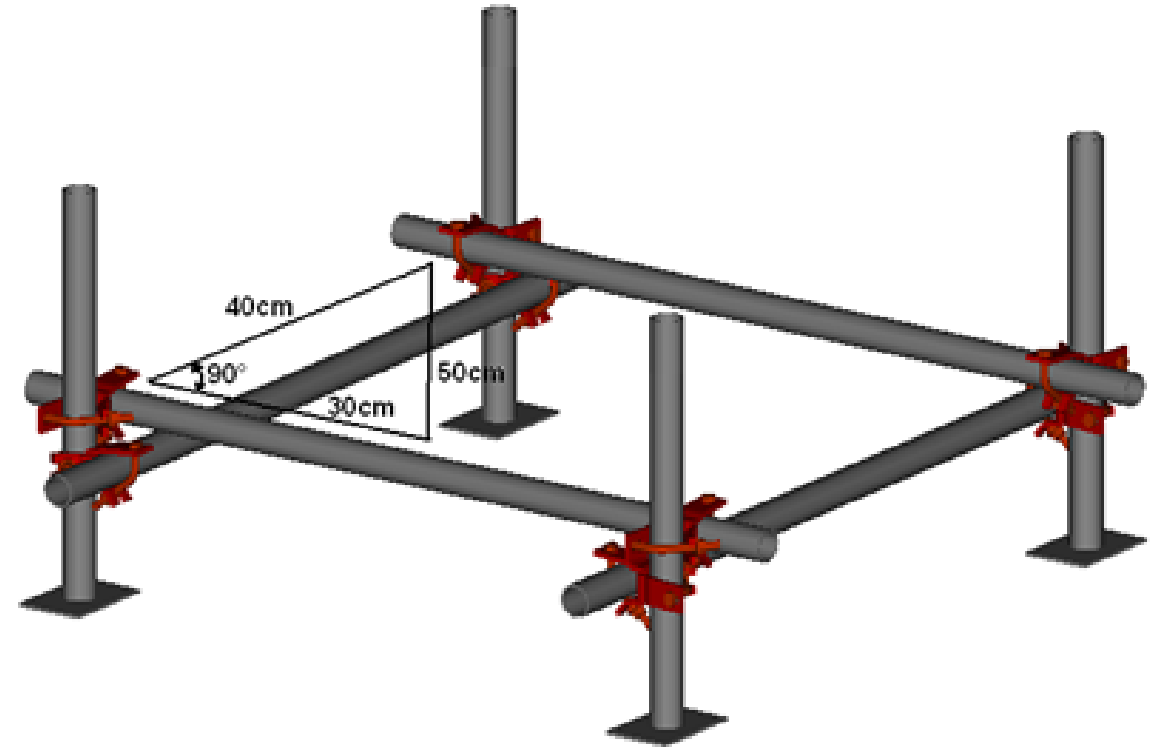
➤ Major Points:

- ❑ 10 foot trigger height for fall protection on scaffolds;
- ❑ 36 inch minimum guardrail height where fall arrest systems are primary fall protection;
- ❑ 38 inch minimum guardrail height where guardrail is primary fall protection;
- ❑ Cross-bracing may be used as guardrail under certain conditions, in lieu of either a mid-rail or a top-rail



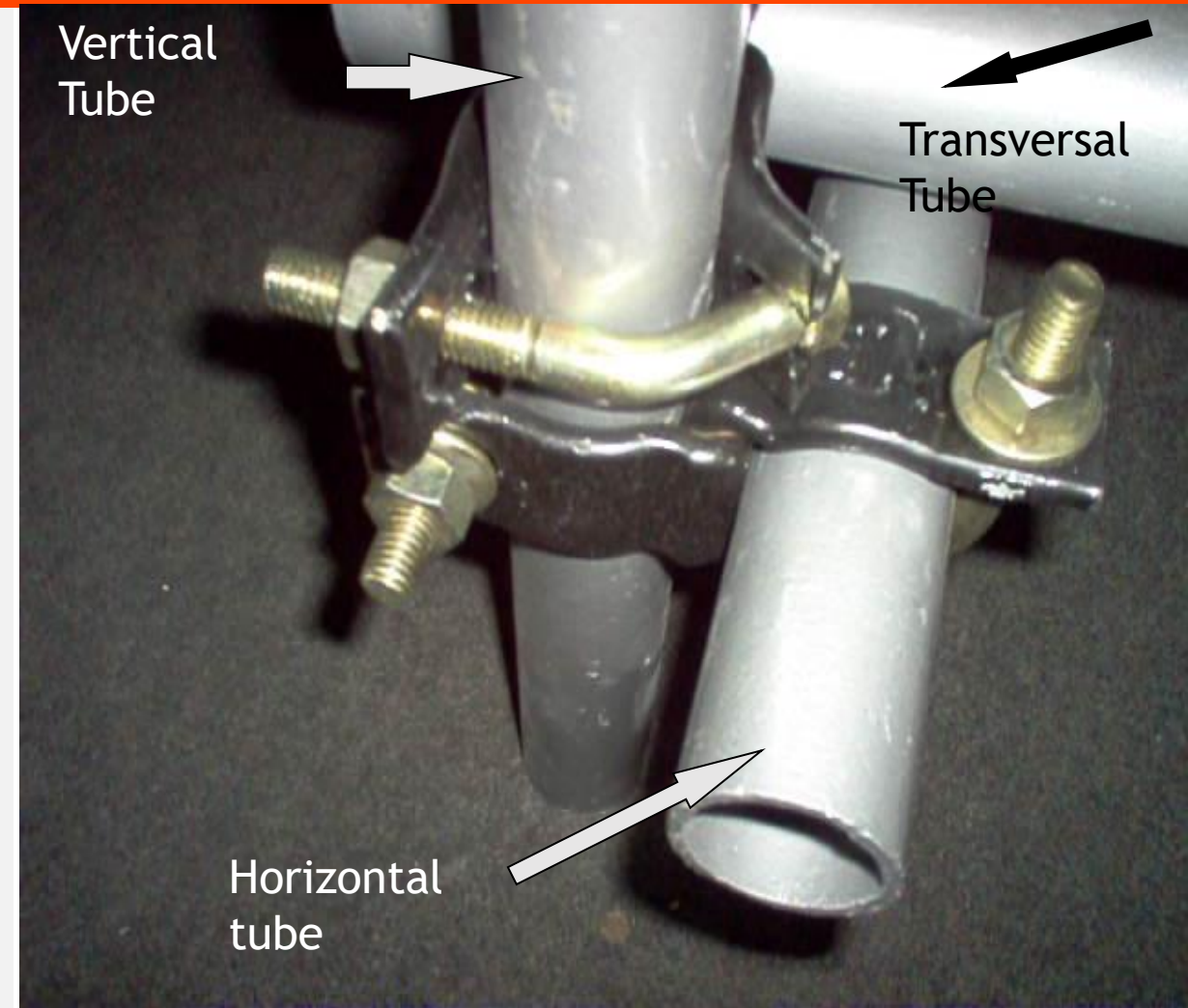
SCAFFOLDING ASSEMBLY

- Width, maximum height on scaffolds and frame
- Length and Width
- ❖ Maximum suggested from 3.00 meters to 3.50 meters diagonal limit;
- ❖ Above 3.50m height, the midrail is required.



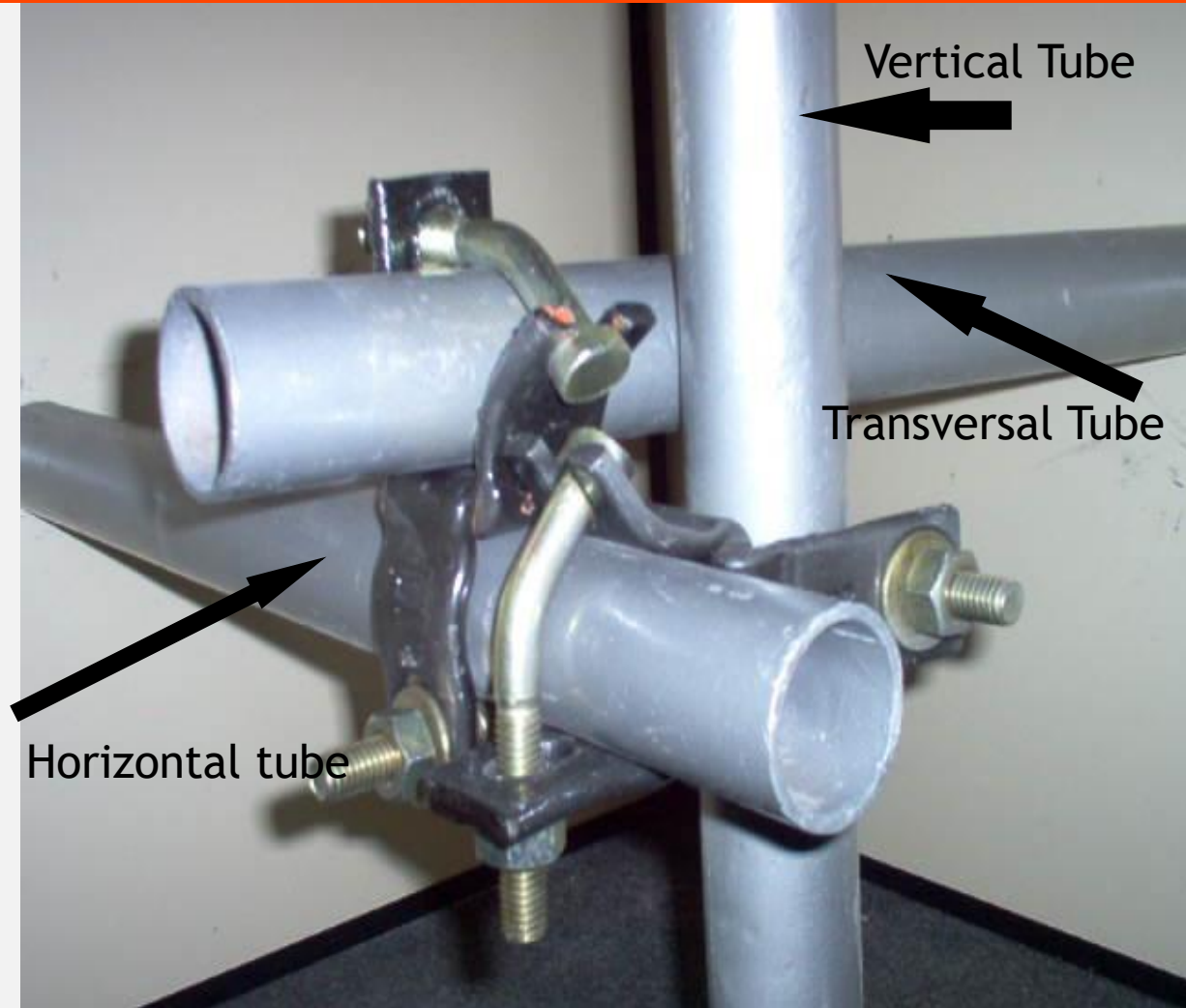
SCAFFOLDING ASSEMBLY

- When the vertical post receives two braces



SCAFFOLDING ASSEMBLY

- When the post receives a single brace



SCAFFOLDING ASSEMBLY

➤ Platform Assembly

- ❖ Fully planked and decked -No more than 1” gap between adjacent units and platform and uprights;
- ❖ Max openings between platform and uprights 9 -1/2” ;
- ❖ Platform and walkways at least 18” wide;
- ❖ Each abutted end shall rest on a separate support surface;
- ❖ Overlap platforms not be less than 12” only over supports unless restrained to prevent movement;



SCAFFOLDING ASSEMBLY

➤ Platform Assembly

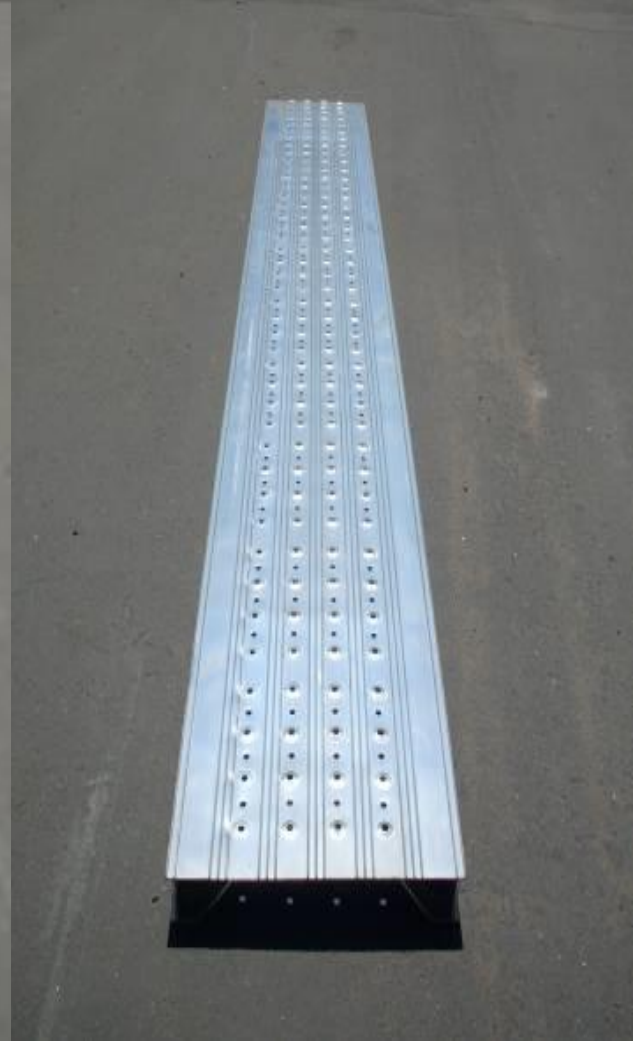
- ❖ On direction changes, platforms that rests on a bearer at an angle other than a right angle must be laid first;
- ❖ Platforms that rest at right angles over the same bearer laid second.



SCAFFOLDING ASSEMBLY

➤ Platform characteristics

- ❑ No paint on wood platforms, except edges that may be marked for identification;
- ❑ Fully planked between from upright and guardrail;
- ❑ No mixed components;
- ❑ No modification of mixed components;
- ❑ No components or dissimilar metals.



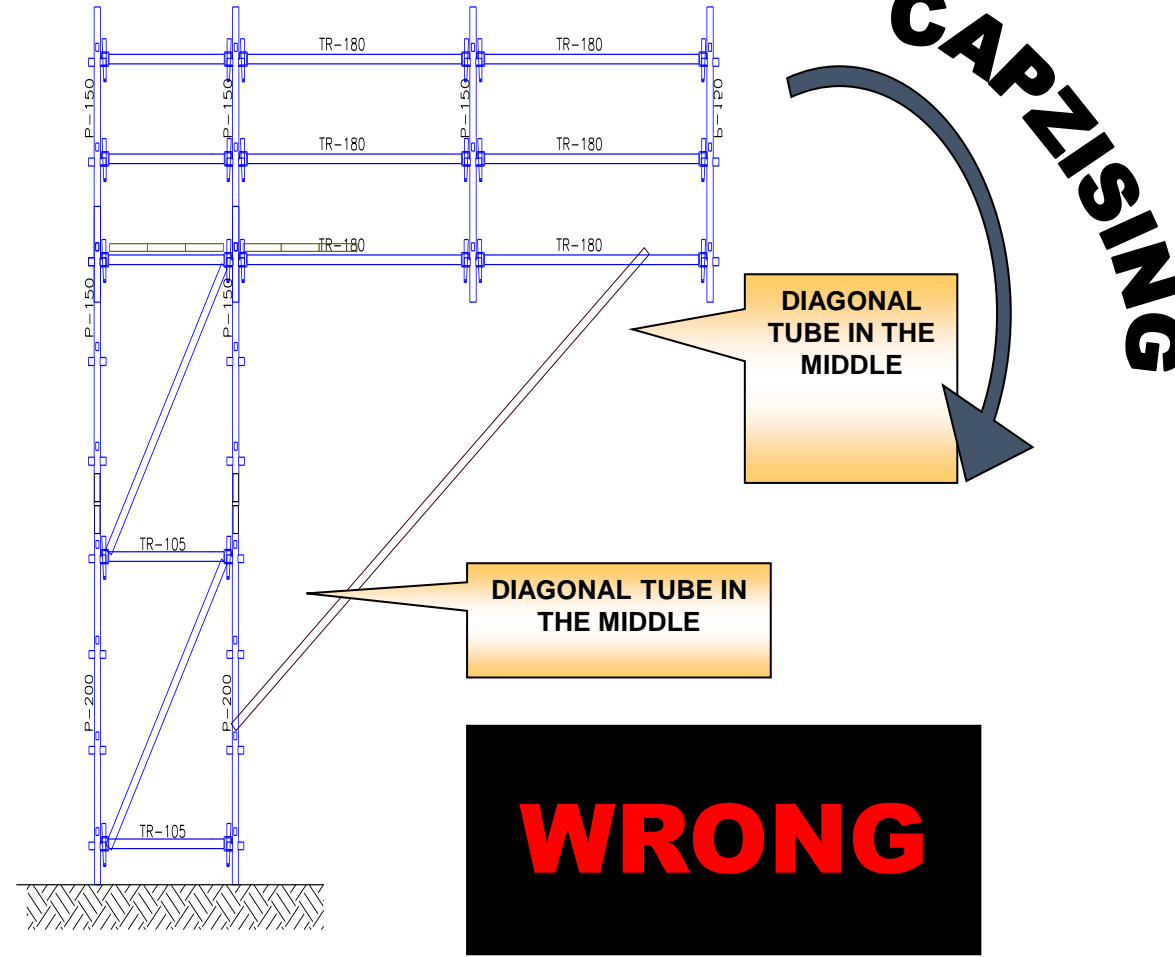
SCAFFOLDING ASSEMBLY

➤ Balance Scaffolding



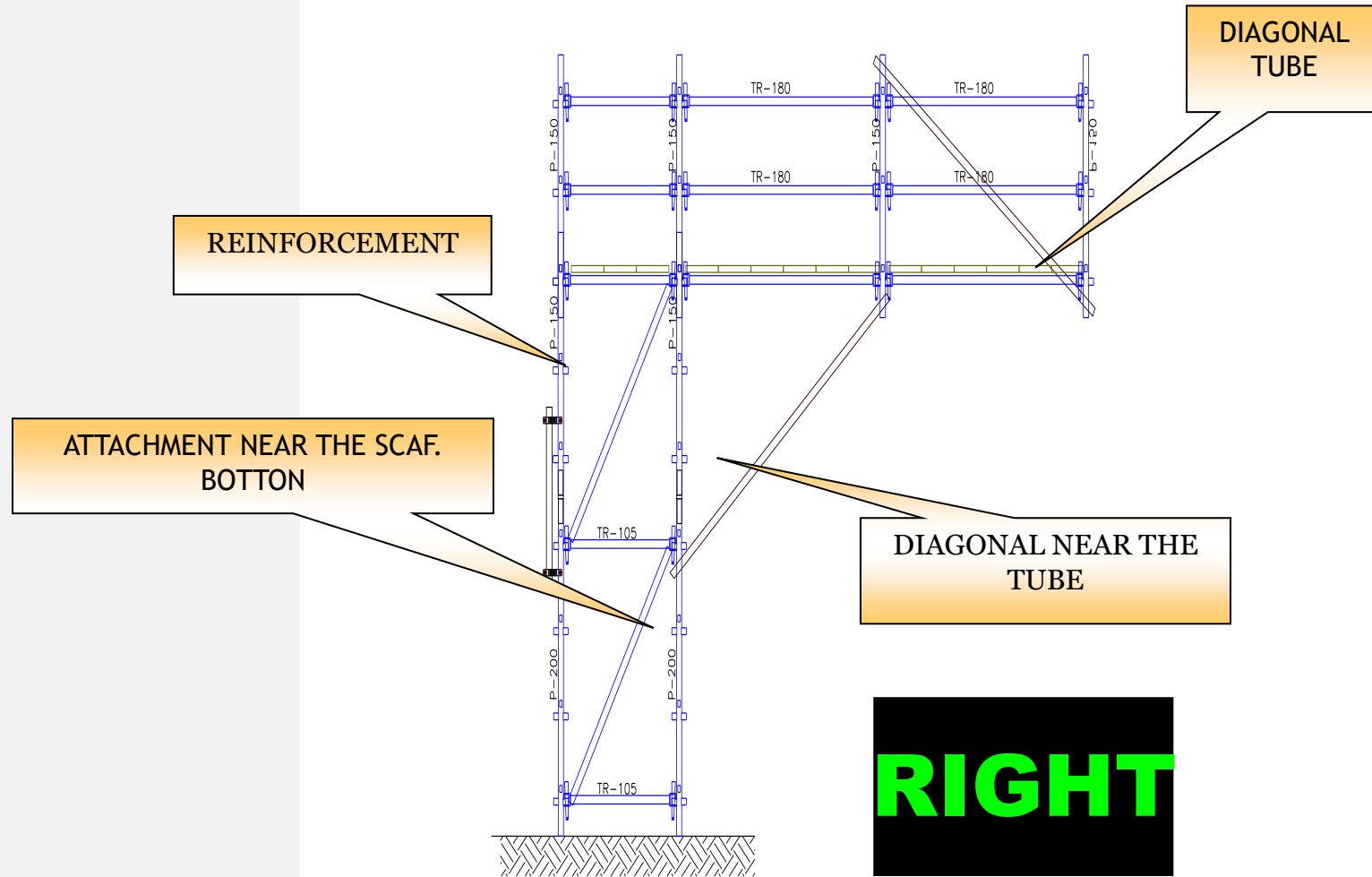
SCAFFOLDING ASSEMBLY

➤ Balance Scaffolding



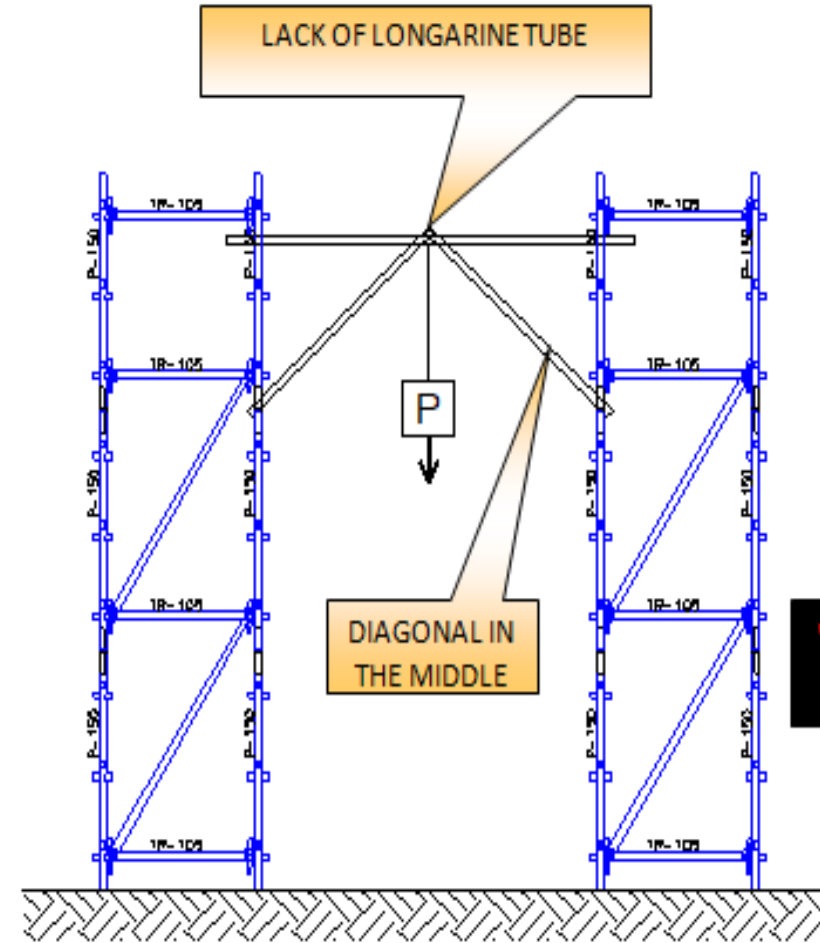
SCAFFOLDING ASSEMBLY

➤ Balance Scaffolding



SCAFFOLDING ASSEMBLY

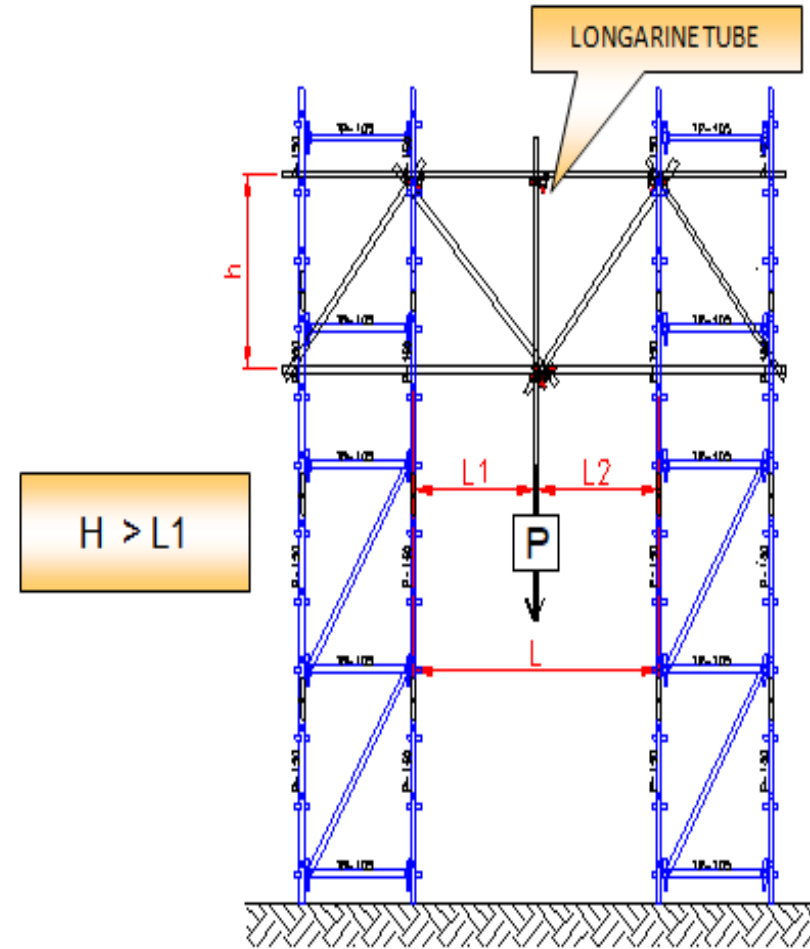
➤ Derrick Scaffolding



WRONG

SCAFFOLDING ASSEMBLY

➤ Derrick Scaffolding



RIGHT

SAFETY DURING USE



LEARNING OBJECTIVES

At the end of this module participants should be able to:

- ❑ Discuss a few actions that must be taken in order to keep the safety during the scaffolding use and assembly;

SAFETY DURING USE

➤ Safety During Use

- ❑ Keep small tools, equipment, bolts, and other loose material in containers to prevent them falling off the scaffold; Kick pates should be placed on each floor to prevent dropping objects;
- ❑ Properly lower tools, or other equipment; do not toss or throw down material from a height, give them hand in hand;
- ❑ Keep scaffolding free of rubbish and other obstructions.



SAFETY DURING USE

➤ Safety During Use

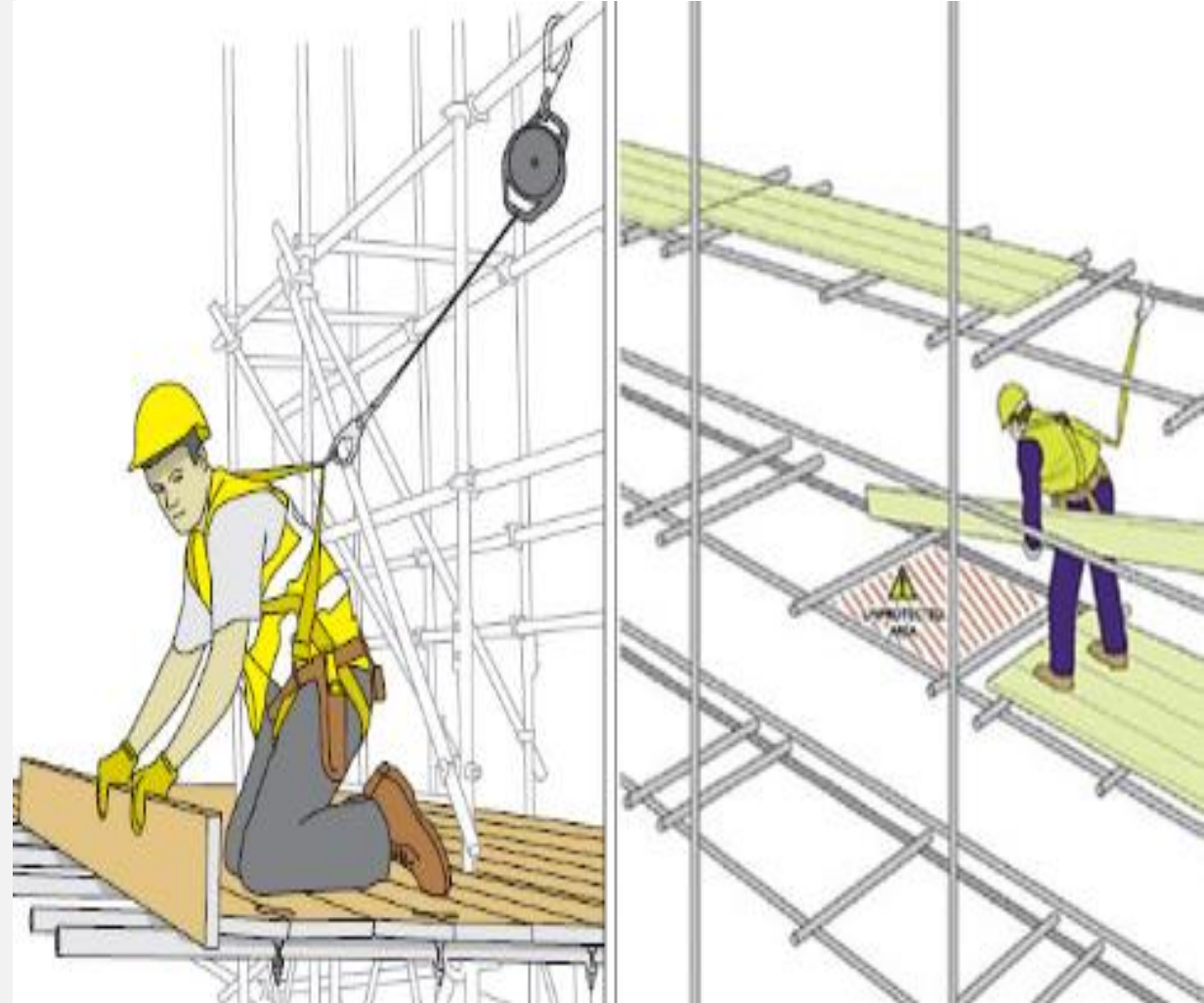
- ❑ Wear and use appropriate personal protection equipment at all times;
- ❑ Do not secure safety harnesses to the scaffolding structure;
- ❑ Use scaffolding only for its intended purpose;
- ❑ Do not overload or extend scaffolding by the use of ladders or other makeshift devices;
- ❑ Do not attach ground leads for welding or any other purpose to scaffolding;



SAFETY DURING USE

➤ Safety During Use

- ❑ Proper clearance near overhead lines -Keep 10 foot minimum unless de-energized.



SCAFFOLDING INSPECTION



LEARNING OBJECTIVES

At the end of this module participants should be able to:

- ❑ Discuss the points to be considered when inspecting scaffoldings.

INSPECTION

➤ Inspecting Tube and Coupler Scaffolds

- ❑ A tube and coupler scaffold is a supported scaffold consisting of platforms supported by individual pieces of tubing, erected with coupling devices connecting uprights, braces, bearers and runners.



INSPECTION

➤ Inspecting Tube and Coupler Scaffolds

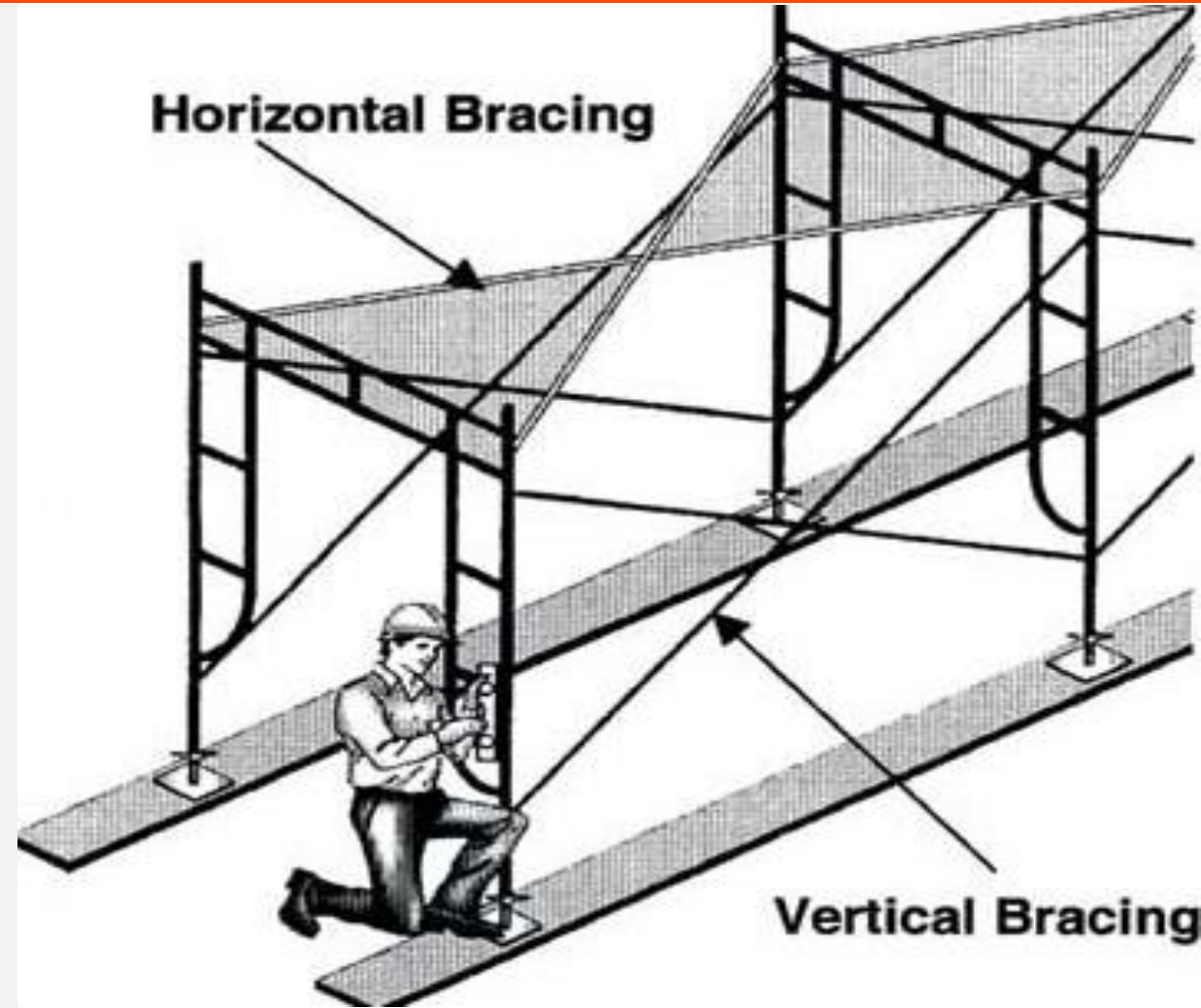
- ❑ Tube and coupler scaffolds more than 125 feet high must be designed by a registered professional engineer and constructed and loaded consistent with the design.



INSPECTION

➤ Bracing

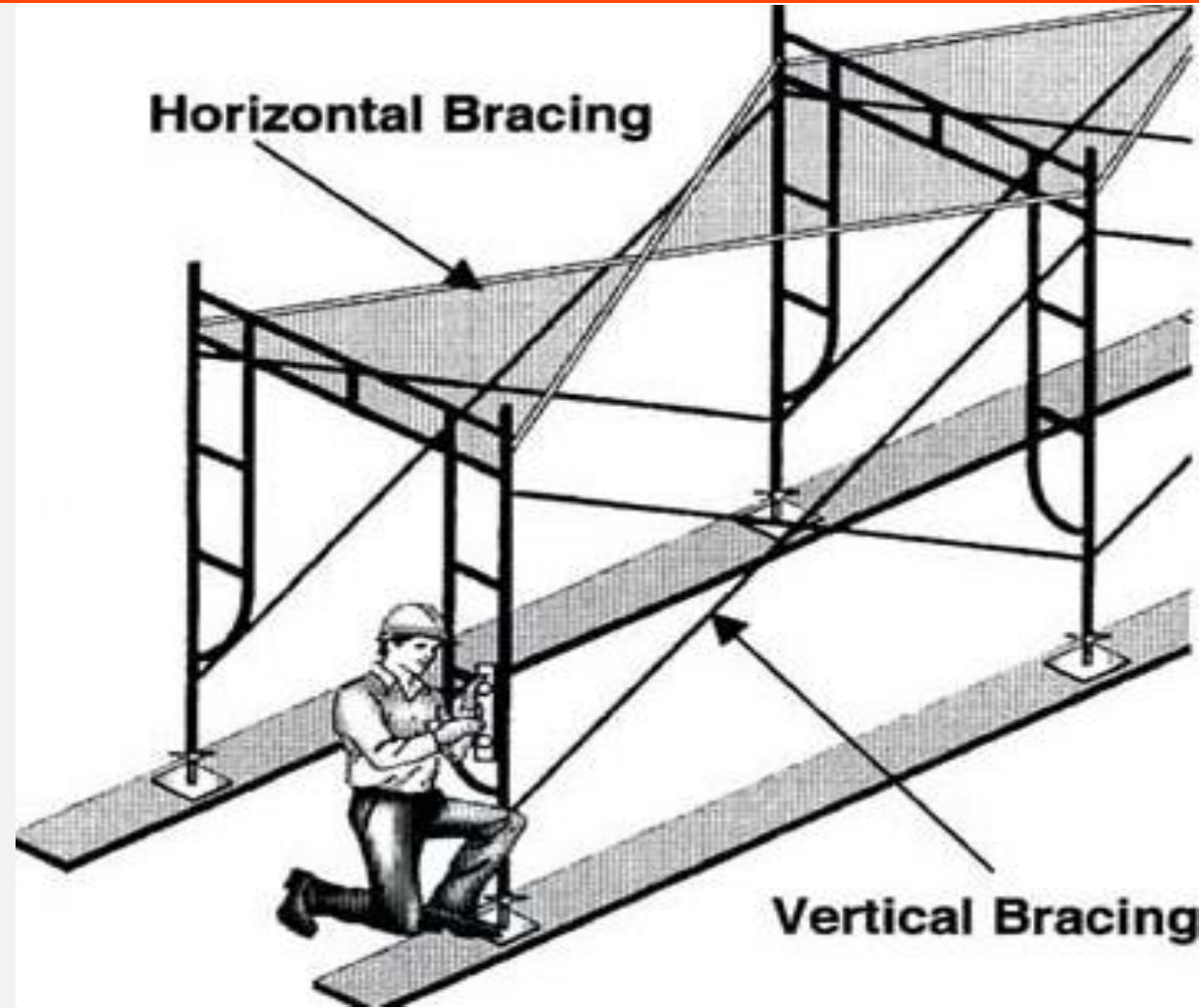
- ❑ Braces are rigid connections that hold one scaffold member in a fixed position with respect to another member, or to a building or structure.
- ❑ Check that transverse bracing forming an "X" across the width of the scaffold is installed at the scaffold ends and at least at every third set of posts horizontally (measured from only one end) and every fourth runner vertically.
- ❑ Ensure bracing extends diagonally from the inner or outer posts or runners upward to the next outer or inner posts or runners.



INSPECTION

➤ Bracing

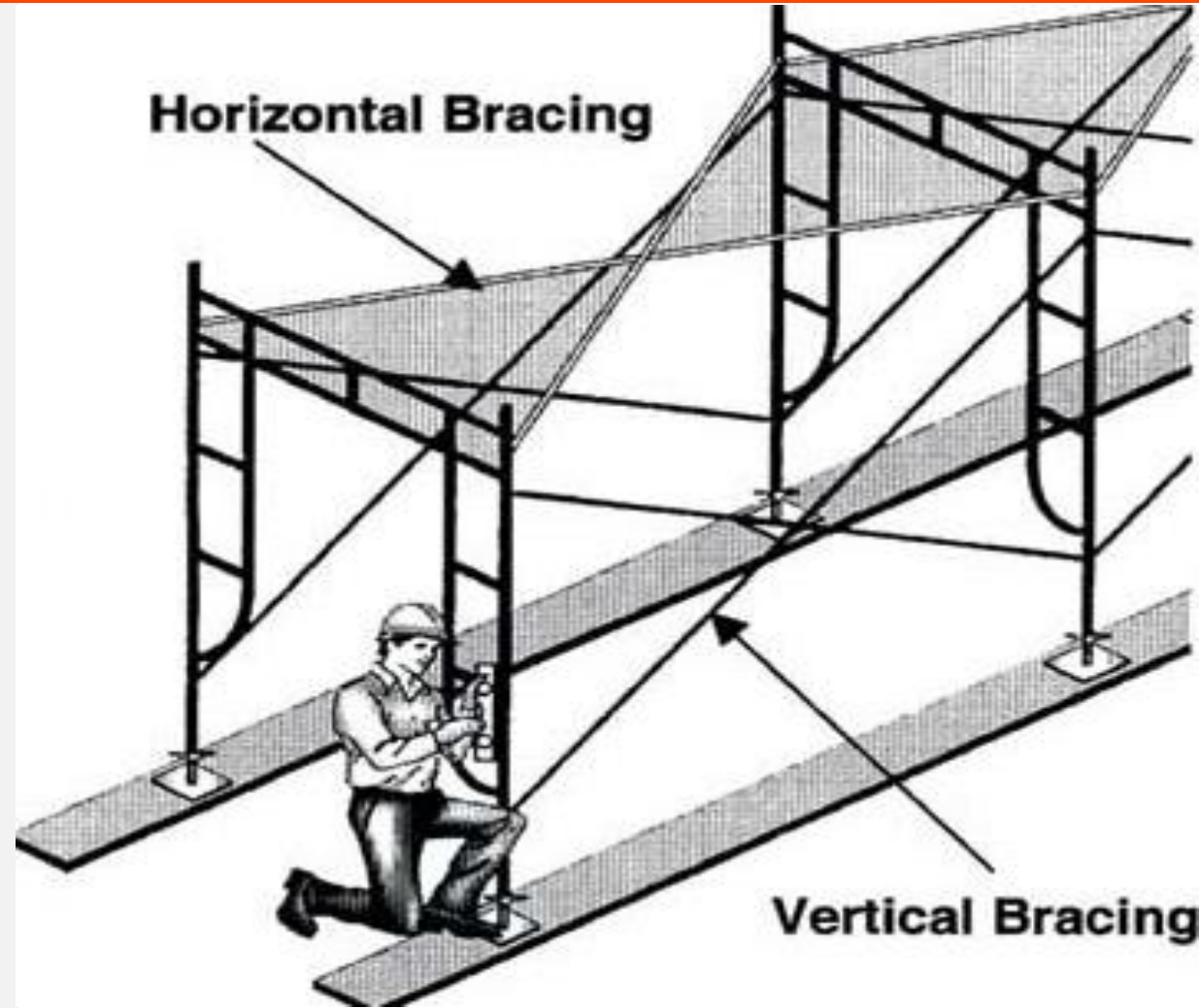
- ❑ Check that building ties are installed at the bearer levels between the transverse bracing and conform to the requirements of OSHA 1926.451(c)(1).
- ❑ Make sure **bracing is placed for each section of six levels between the fourth and sixth levels.**
- ❑ Ensure bracing extends diagonally from the inner or outer posts or runners at the **bottom of the fourth level**, upward to the inner or outer posts or runners at the bottom of the fifth level, and likewise to the sixth level.



INSPECTION

➤ Bracing

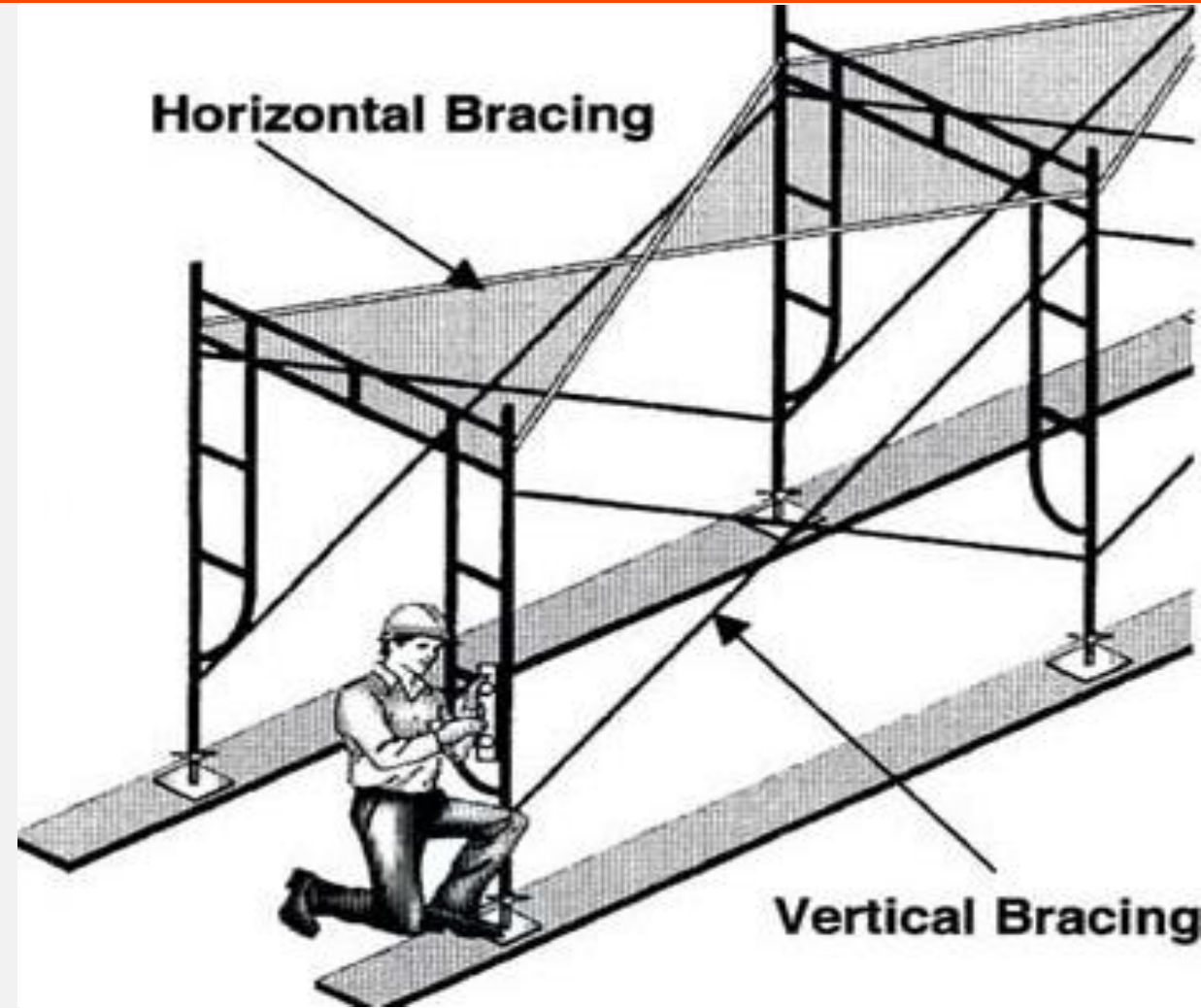
- ❑ Check that on straight run scaffolds, longitudinal/diagonal bracing across the inner and outer rows of posts;
- ❑ When the length of the scaffold is greater than the height, bracing should be repeated starting at least with every fifth post.
- ❑ When the length is shorter than the height, bracing should be installed from the base of end posts upward to the opposite end posts and then in alternating directions until the top of the scaffold is reached.



INSPECTION

➤ Bracing

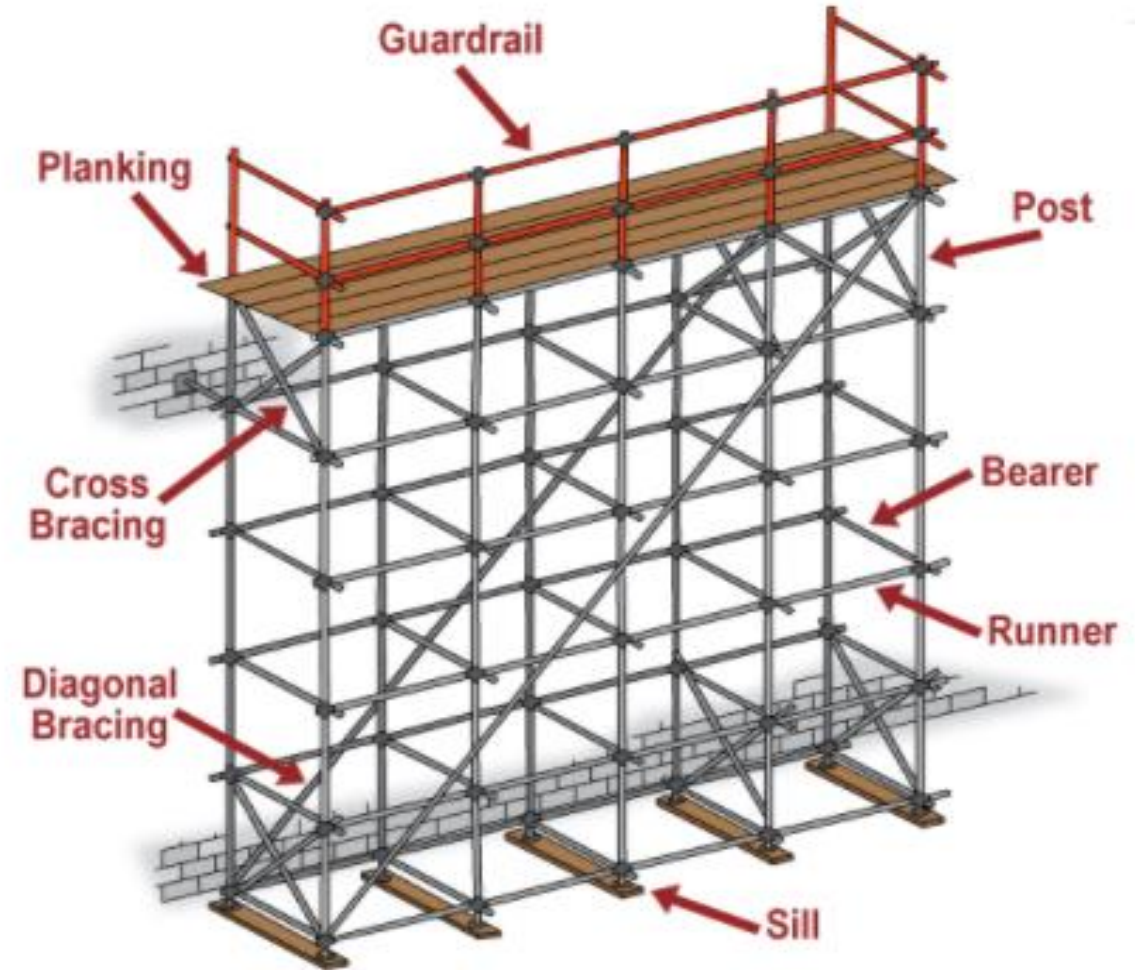
- ❑ In situations where the attachment of bracing to posts is precluded, the bracing should be attached to the runners



INSPECTION

➤ Bearers

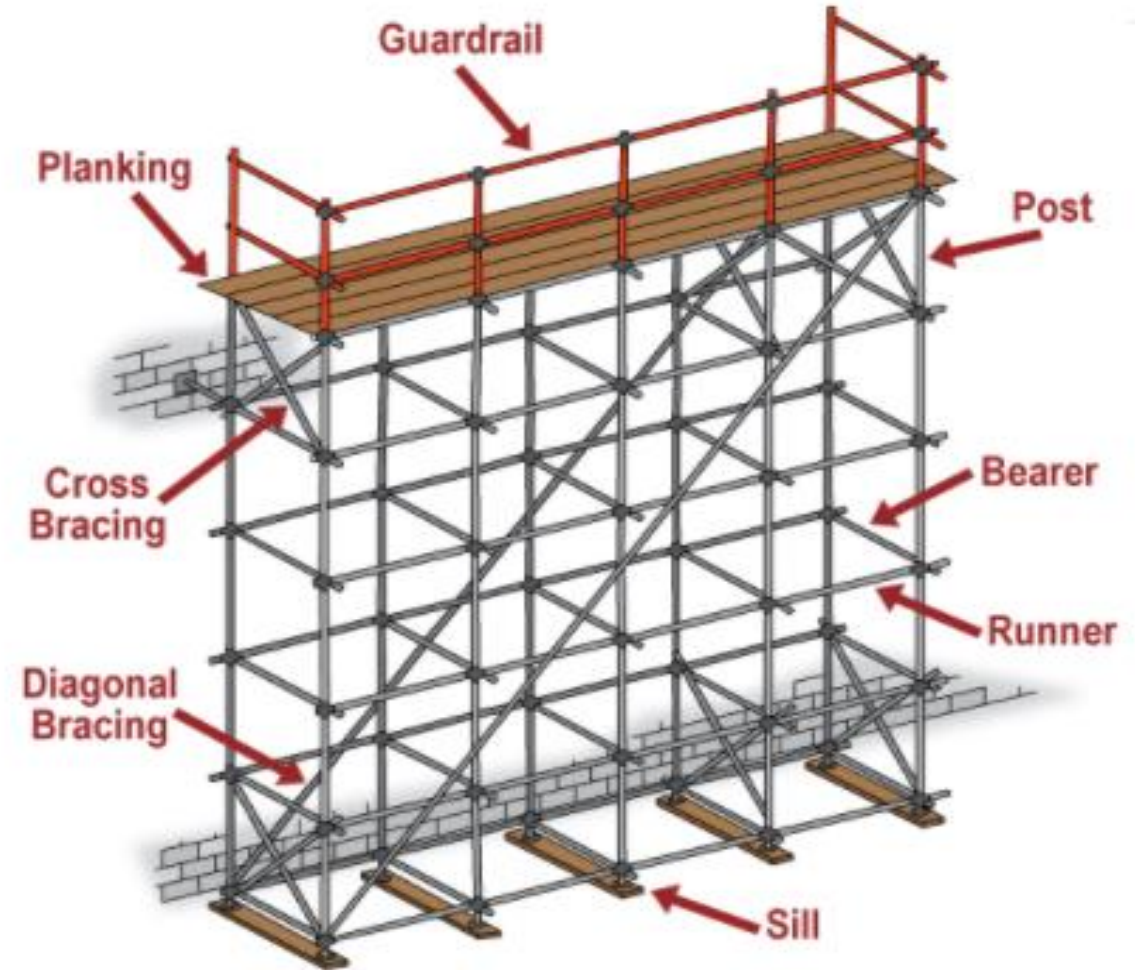
- ❑ Bearers should be installed transversely between the posts, and when coupled to the posts, the inboard coupler should bear directly on the runner coupler.
- ❑ When the bearers are coupled to the runners, the couplers should be as close to the posts as possible.
- ❑ Bearers should extend beyond the posts and runners and provide full contact with the coupler.
- ❑ When platforms are being moved to the next level, verify that the existing platform is left undisturbed until new bearers have been set in place and braced prior to receiving the new platforms.



INSPECTION

➤ Runners

- ❑ The scaffold should have runners installed along its entire length and along both the inside and outside posts at the various level heights.
- ❑ Runners should be interlocked on straight runs to create continuous lengths and be **coupled to each post**.
- ❑ Bottom runners should be located as close to the base as possible. Couplers should be made of structural metal.



INSPECTION

➤ Mobile Scaffolds

- ❑ Ensure scaffolds are braced by cross, horizontal or diagonal braces, or combination thereof, to prevent racking or collapse, and that vertical members are secured together laterally so that vertical members are squared and aligned.
- ❑ Make sure scaffolds should be plumb, level and squared and that all brace connections are secured.
- ❑ Ensure platforms do not extend past the base supports unless outrigger frames or equivalent devices are used to ensure stability.



INSPECTION

➤ Mobile Scaffolds

- ❑ Check to see that platforms do not extend past the base supports unless outrigger frames are used.
- ❑ Make sure caster and wheel stems are pinned or otherwise secured in scaffold legs.
- ❑ Make sure that, while in a stationary position, casters and wheels are locked with a positive wheel and/or wheel and swivel locks, or equivalent means, to prevent movement.



INSPECTION

➤ Mobile Scaffolds

- ❑ Check that employees are not allowed to ride on a mobile scaffold unless strict controls are followed;
- ❑ When manual force is used to move the scaffold, make sure the force is applied as close to the base as practicable, but no more than 5 feet above the supporting surface;



INSPECTION

➤ Mobile Scaffolds

- ❑ Make sure powered systems used to propel mobile scaffolds are designed for such use.
- ❑ Ensure forklifts, trucks, similar motor vehicles or add-on motors are not used to propel scaffolds unless the scaffold is designed for such propulsion systems.



INSPECTION

➤ Specific Requirements Double Pole Scaffold

- ❑ Where wooden poles are spliced, the following regulations apply:
 - ❖ The ends must be squared.
 - ❖ The upper section must rest squarely on the lower section.
 - ❖ Wood splice plates or scab plates must be provided on at least two adjacent sides, and must:
 - ❖ Extend at least 2 feet on either side of the splice.

DOUBLE POLE SCAFFOLD



INSPECTION

➤ Specific Requirements Double Pole Scaffold

- ❑ Where wooden poles are spliced, the following regulations apply:
 - ❖ Overlap the abutted ends equally.
 - ❖ Have at least the same cross-sectional areas as the pole.
 - ❖ Splice plates made of materials other than wood may be used, as long as they are of equivalent strength.

DOUBLE POLE SCAFFOLD



INSPECTION

➤ Specific Requirements Double Pole Scaffold

- ❑ Pole scaffolds over 60 feet in height must:
 - ❖ Be designed by a registered professional engineer.
 - ❖ Be constructed and loaded in accordance with that design.

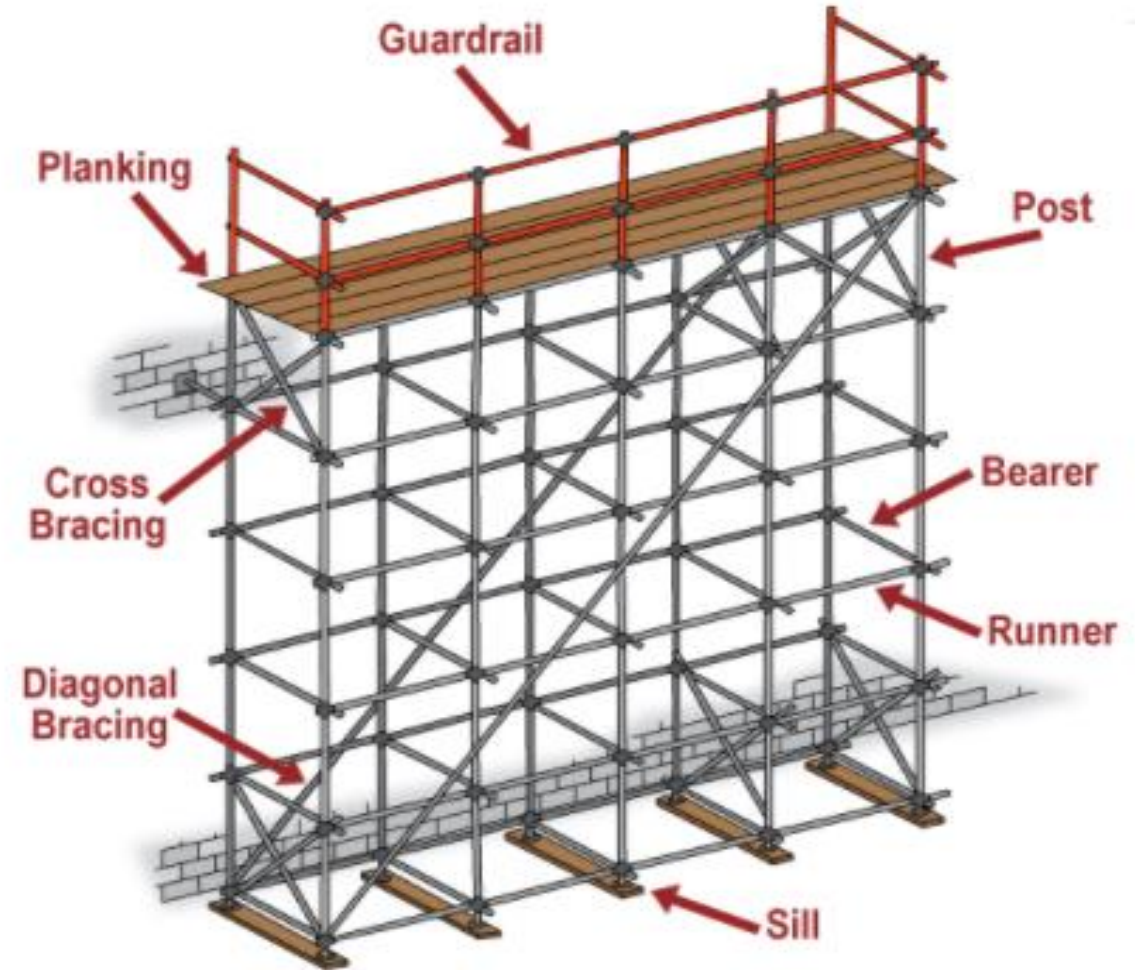
DOUBLE POLE SCAFFOLD



INSPECTION

➤ Inspecting Braces, Bearers, and Runners

- ❑ Diagonal bracing must be installed in both directions across:
 - ❖ The entire outside face of double- and single-pole scaffolds.
 - ❖ The entire inside face of double-pole scaffolds used to support loads of 50 lbs. or more per square foot.
 - ❖ Runners and bearers must be installed on edge.
 - ❖ Bearers must extend a minimum of 3 inches over the outside edge of runners.

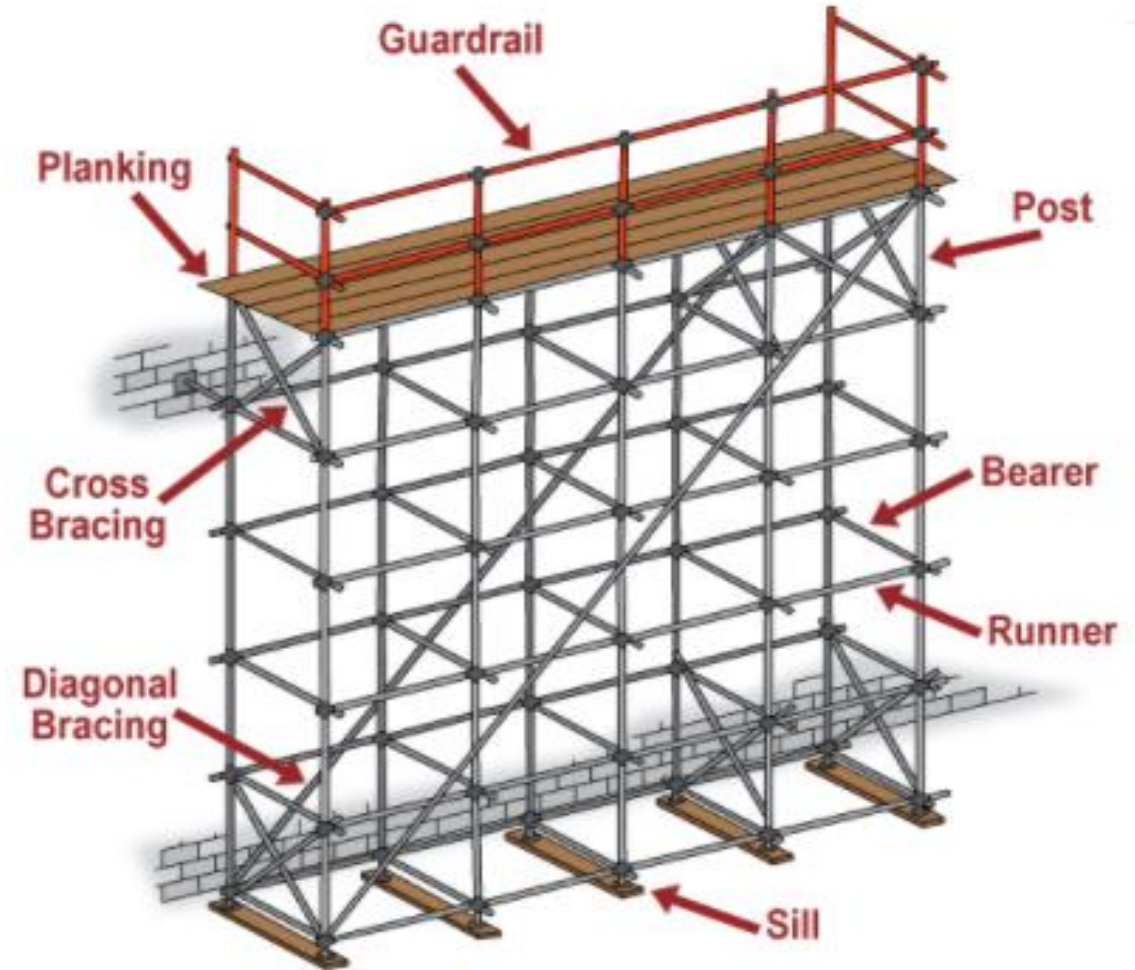


INSPECTION

➤ Inspecting Braces, Bearers, and Runners

❑ Runners must:

- ❖ Extend over two poles at minimum.
- ❖ Be supported by bearing blocks securely attached to the poles.
- ❖ Braces, bearers, and runners must not be spliced between poles.



INSPECTION

➤ Outrigger Scaffolds

- ❑ Make sure outrigger beams are:
 - ❖ secured in place to prevent movement
 - ❖ securely braced at the fulcrum point to prevent tipping



INSPECTION

➤ Outrigger Scaffolds

❑ To prevent their displacement, make sure platform units are:

- ❖ nailed
- ❖ bolted
- ❖ otherwise secured to outriggers
- ❖ Verify scaffolds and scaffold components are:
- ❖ designed by a registered professional engineer



INSPECTION

➤ Outrigger Scaffolds

- ❑ To prevent their displacement, make sure platform units are:
 - ❖ constructed and loaded in accordance with that design



INSPECTION

➤ Horse Scaffolds

- ❑ Make sure these scaffolds are no more than 10 feet or two tiers in height, whichever is less.
- ❑ The legs of each horse must be nailed down or otherwise secured to prevent displacement.
- ❑ Each tier must be crossbraced.

Maximum intended load (light duty)	25 pounds/foot ² *
Maximum intended load (med. duty)	50 pounds/foot ² *
Bearers (light duty)	2 x 4 inches
Bearers (medium duty)	3 x 4 inches
Legs	2 x 4 inches
Longitudinal bracing between legs	1 x 6 inches
Gusset braces at top of legs	1 x 8 inches
Half diagonal braces	2 x 4 inches
*Horses shall be spaced not more than 8 feet apart for light-duty loads, and not more than 5 feet apart for medium-duty loads. [1926 Subpart L Appendix A (2)(f)]	

INSPECTION

➤ Step, Platform and Trestle Ladder Scaffolds

- ❑ Verify scaffold platforms are placed no higher than the second-highest rung or step of the ladder supporting the platform.
- ❑ Ensure ladders are prevented from slipping by how they are placed, fastened or equipped.
- ❑ Make sure job-made ladders are not permitted to be used for these scaffolds.
- ❑ Make sure these scaffolds must not be bridged one to another.



INSPECTION

➤ Inspecting Plasterers', Decorators', and Large-Area Scaffolds

❑ Check these scaffolds to make sure they are constructed in accordance with the requirements for the following scaffolds, as appropriate:

- ❖ pole scaffolds;
- ❖ tube and coupler scaffolds;
- ❖ fabricated frame scaffolds

LARGE AREA SCAFFOLD (PLASTER/DECORATOR)



INSPECTION

- Inspecting Suspended Scaffolds.
- Inspecting the Anchorage
- ❖ The safe use of a suspended scaffold begins with secure anchorage.
- ❖ The weight of the scaffold and its occupants should be supported by both the structure to which it is attached and by each of the scaffold components that make up the anchorage system.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Anchorage Tiebacks

- ❖ The tiebacks should be secured to a structurally sound anchorage on the building or structure, which may include structural members.
- ❖ A good example would be an anchor mounted in concrete with drilled-in fasteners.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Anchorage Tiebacks

In your inspection, make sure tiebacks are:

- ❖ not secured by vents, electrical conduit, or standpipes and other piping systems
- ❖ installed perpendicular to the face of the building or structure, or opposing angle tiebacks should be installed (single tiebacks installed at an angle are prohibited)
- ❖ equivalent in strength to the suspension ropes and hoisting rope

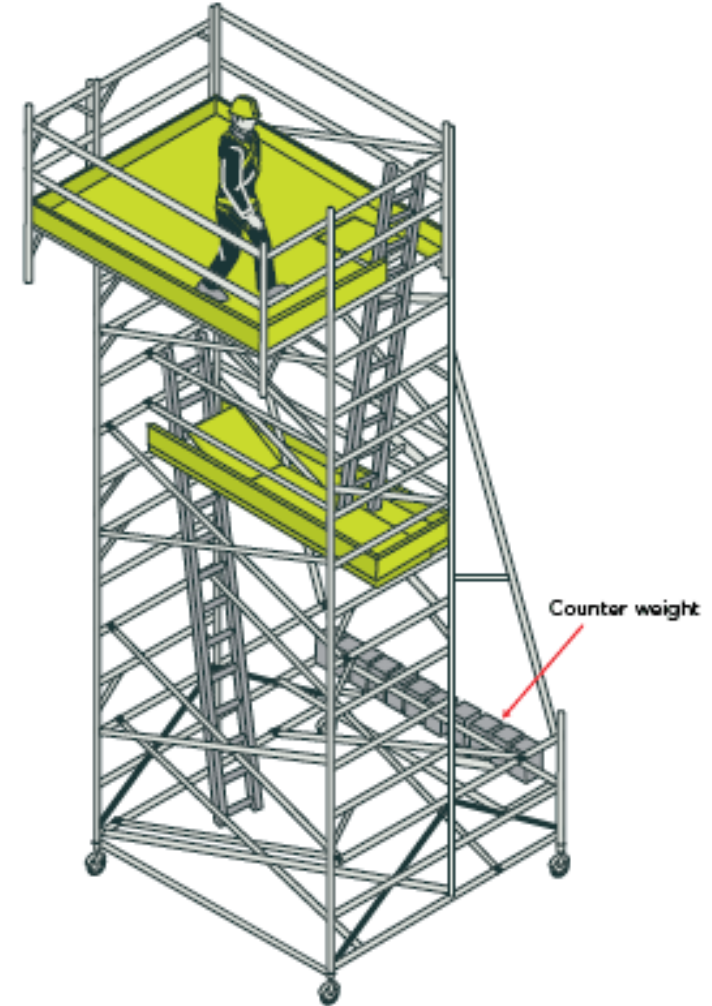


INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Anchorage Counterweights

- ❖ Safety factors for the counterweights, riggings, and direct connections to roofs, floors, and suspension ropes of adjustable suspension scaffolds should be based on the rated load and the stall load of the hoist, not the maximum intended load.



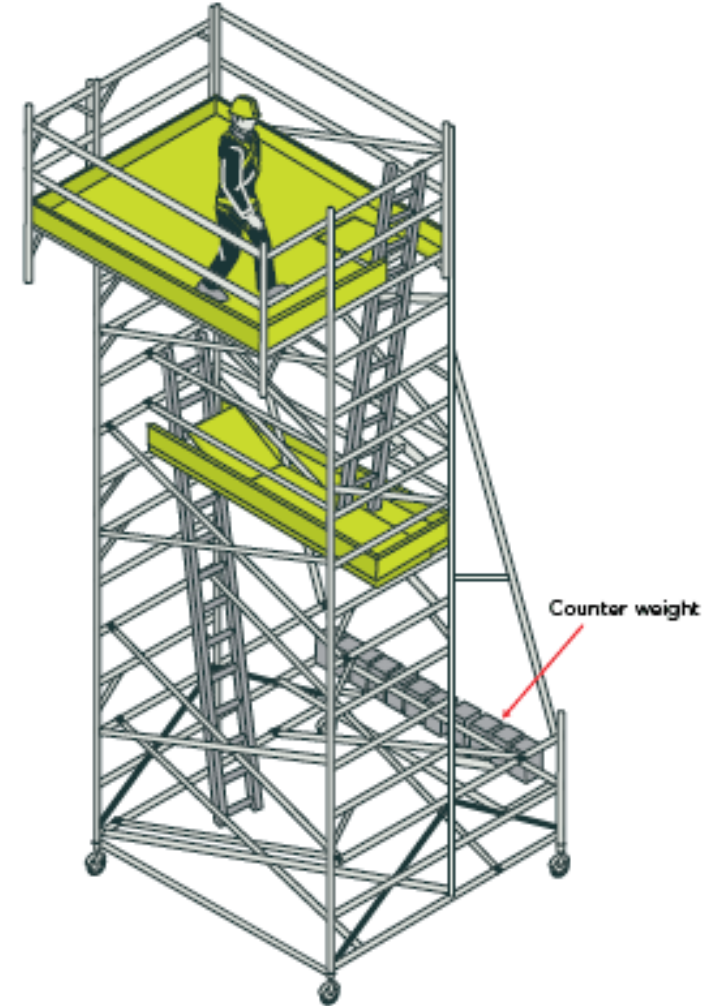
INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Anchorage Counterweights

Make sure suspended scaffold outrigger beams are stabilized by:

- ❖ counterweights
- ❖ bolts or other direct connections to the floor or decks



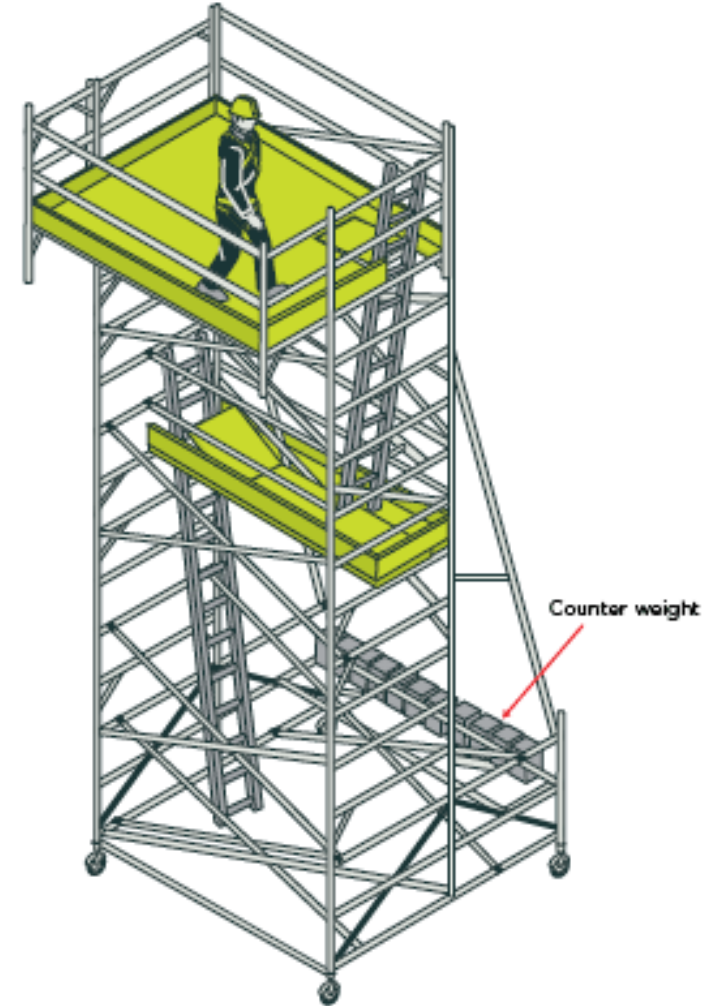
INSPECTION

➤ Inspecting Suspended Scaffolds.

☐ Anchorage Counterweights

Check that counterweights used to balance adjustable suspension scaffolds are capable of resisting:

- ❖ at least 4 times the tipping moment imposed by the scaffold when it is operating at the rated load of the hoist (see counterweight formula to the right)
- ❖ a minimum of $1\frac{1}{2}$ times the tipping moment imposed by the scaffold when it is operating at the stall load of the hoist, whichever is greater



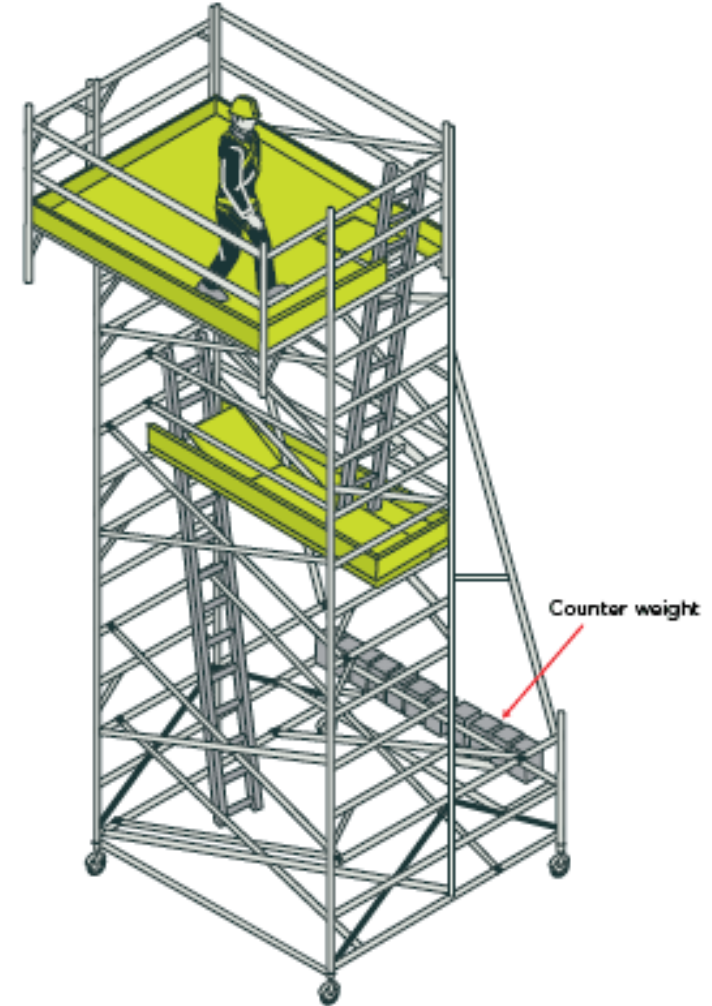
INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Anchorage Counterweights

Check that counterweights used to balance adjustable suspension scaffolds are capable of resisting:

- ❖ Ensure only items specifically designed as counterweights are used to counterweight scaffold systems.
- ❖ Check to make sure masonry units, rolls of roofing felt, and other similar construction materials are not being used as counterweights.



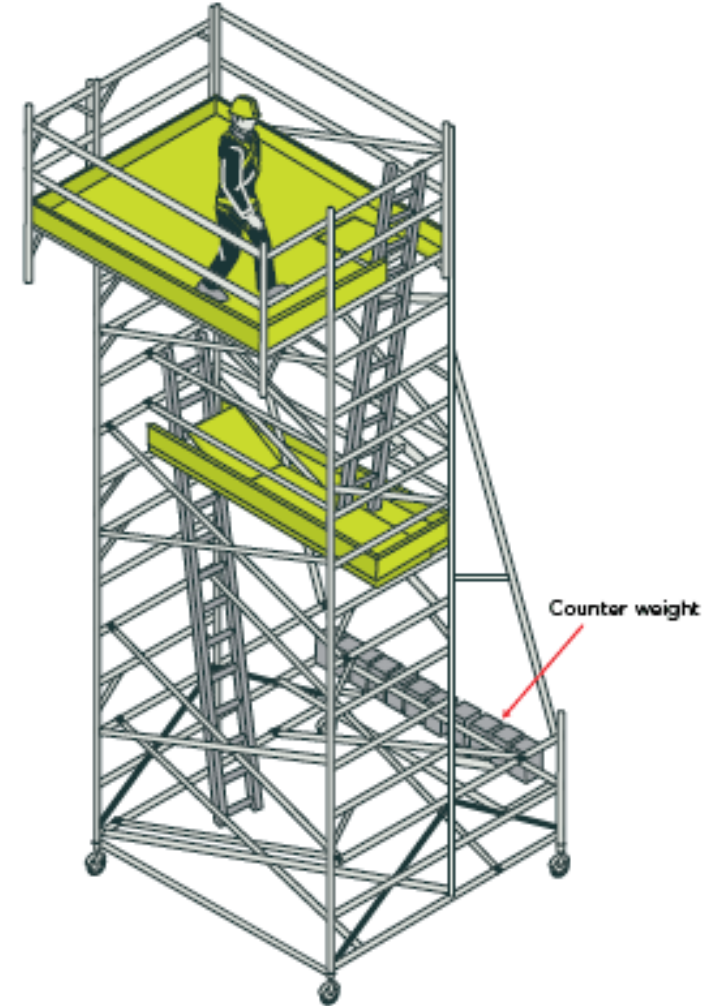
INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Anchorage Counterweights

Check that counterweights used to balance adjustable suspension scaffolds are capable of resisting:

- ❖ Ensure counterweights are not made of flowable materials such as sand, gravel, and similar materials that can be easily dislocated.
- ❖ An acceptable material for use would be a counterweight made of cast iron.



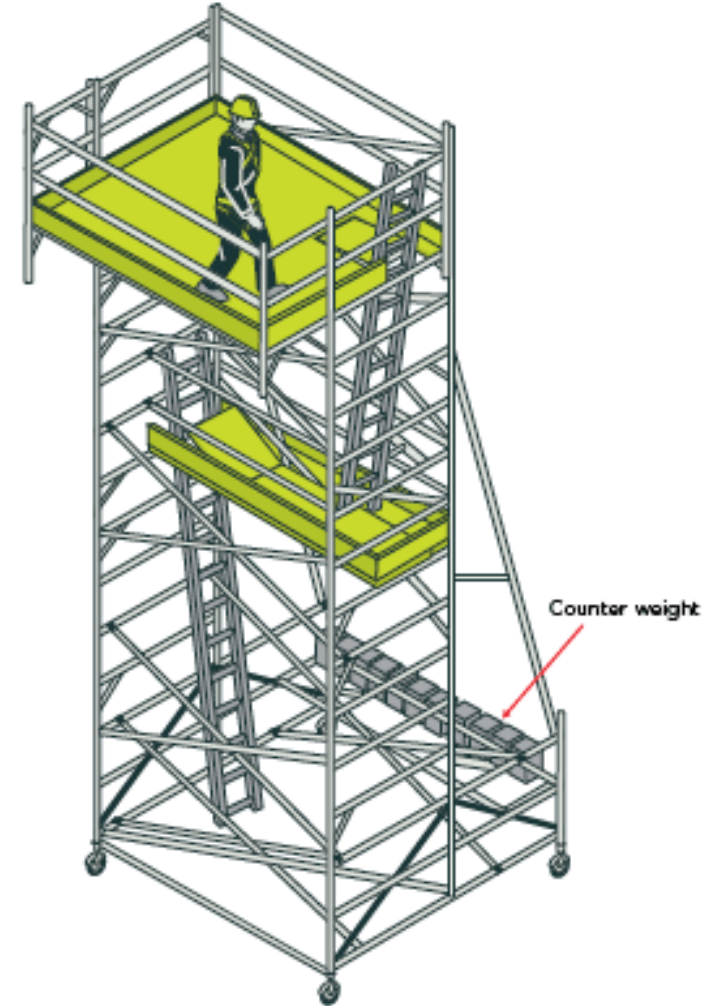
INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Anchorage Counterweights

Check that counterweights used to balance adjustable suspension scaffolds are capable of resisting:

- ❖ Make sure counterweights are secured by mechanical means to the outrigger beams to prevent accidental displacement.
- ❖ Counterweights should not be removed from an outrigger beam until the scaffold is disassembled.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Direct Connections

- ❖ Direct connections and counterweights used to balance adjustable suspension scaffolds should resist at least four times the tipping force of the scaffold.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Direct Connections

Make sure direct connections to roofs and floors are capable of resisting whichever of the following is greater:

- ❖ at least 4 times the tipping moment imposed by the scaffold when it is operating at the rated load of the hoist; or
- ❖ a minimum of $1\frac{1}{2}$ times the tipping moment imposed by the scaffold when it is operating at the stall load of the hoist.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Support Capacity

- ❖ Ensure scaffolds and scaffold components are capable of supporting, without failure, their own weight and at least 4 times their maximum intended load.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Support Capacity

Make sure each suspension rope, including connecting hardware, is capable of supporting, without failure, at least 6 times the maximum intended load applied to that rope while the scaffold is operating at the greater of either:

- ❖ the rated load of the hoist
- ❖ 2 times the stall load of the hoist



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Support Capacity

- ❖ Inspect to ensure all suspension scaffold support devices, such as outrigger beams, cornice hooks, and parapet clamps to ensure that:
 - they rest on surfaces capable of supporting at least 4 times the load imposed on them by the scaffold operating at the greater of either:
 - rated load of the hoist
 - 1½ times the stall capacity of the hoist



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Support Capacity

outrigger beams are installed at right angles to the face of the building and:

- ❖ secured against movement with tiebacks and or the structure; or
- ❖ by opposing angle tiebacks installed and secured to a structurally sound point of anchorage such as structural members other than vents, electrical conduit, or standpipes and other piping systems.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Support Capacity

outrigger beams are installed at right angles to the face of the building and:

- ❖ they occupy no more than two employees occupy suspension scaffolds designed for a working load of 500 pounds (non-mandatory);
- ❖ they occupy no more than three employees occupy suspension scaffolds designed for a working load of 750 pounds (non-mandatory); and



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Support Capacity

outrigger beams are installed at right angles to the face of the building and:

- ❖ suspension scaffolds are altered only under the supervision and direction of a competent person.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Inspecting Outrigger Beams

During your inspection of outrigger beams, check that:

- ❖ they are made of structural metal, or other material of equivalent strength;
- ❖ they are restrained to prevent movement;
- ❖ they have stop bolts or shackles at both ends;



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Inspecting Outrigger Beams

During your inspection of outrigger beams, check that:

- ❖ they are securely fastened together with the flanges turned out when channel iron beams are used instead of I-beams;
- ❖ they are installed with all bearing supports perpendicular to the beam center line;
- ❖ they are set and maintained with the web in a vertical position;



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Inspecting Outrigger Beams

During your inspection of outrigger beams, check that:

- ❖ they are attached to the scaffold ropes by a shackle or clevis placed directly over the stirrup;
- ❖ their inboard ends are stabilized by bolts or other direct connections to the floor or roof deck, or by counterweights;
- ❖ they are secured by tiebacks if outrigger beams are not stabilized by bolts or other direct connections to the floor or roof deck.



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Inspecting Outrigger Beams

During your inspection of outrigger beams, check that:

- ❖ they are placed at a perpendicular (horizontal 90-degree angle) to their bearing support (usually the face of the building) when feasible;
- ❖ they are placed at some an acceptable angle, with opposing-angle tiebacks if perpendicular placement is not possible because of obstructions that cannot be moved.



INSPECTION

- Inspecting Suspended Scaffolds.
- ❑ Inspecting Suspension Ropes
 - ❖ Check suspension ropes supporting adjustable suspension scaffolds to ensure they have a diameter large enough to permit proper functioning of brake and hoist mechanisms.
 - ❖ Make sure the use of repaired wire rope as suspension rope is prohibited.
 - ❖ Ensure wire suspension ropes are not joined together except through the use of eye splice thimbles connected with shackles or coverplates and bolts.



INSPECTION

- Inspecting Suspended Scaffolds.
- ❑ Inspecting Suspension Ropes
 - ❖ Make sure the load end of wire suspension ropes are equipped with proper-size thimbles, and secured by eyesplicing or equivalent means.
 - ❖ Ensure competent persons are inspecting ropes for defects prior to each work shift, and after every occurrence which could affect a rope's integrity.



INSPECTION

➤ Inspecting Suspended Scaffolds.

☐ Inspecting Suspension Ropes

Check that ropes are replaced when any of the following conditions exist:

- ❖ any physical damage which impairs the function and strength of the rope
- ❖ kinks that might impair the tracking or wrapping of the rope around the drum or sheave of the hoist
- ❖ six randomly distributed wires are broken in one rope lay, or three broken wires in one strand in one rope lay



INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ Inspecting Suspension Ropes

Check that ropes are replaced when any of the following conditions exist:

- ❖ loss of more than one-third of the original diameter of the outside wires due to abrasion, corrosion, scrubbing, flattening, or peening
- ❖ heat damage caused by a torch, or any damage caused by contact with electrical wires
- ❖ evidence that the secondary brake has been activated during an overspeed condition and has engaged the suspension rope



INSPECTION

- **Inspecting Suspended Scaffolds.**
- ❑ Ensure swaged attachments or spliced eyes on wire suspension ropes are not used unless they are made by the manufacturer or a qualified person.



INSPECTION

- Inspecting Suspended Scaffolds.
- ❑ When wire rope clips are used on suspension scaffolds, ensure:
 - ❖ **A minimum of 3 clips are installed, with the clips a minimum of 6 rope diameters apart.**
 - ❖ Clips are installed according to the manufacturer's recommendations.
 - ❖ Clips are retightened to the manufacturer's recommendations after the initial loading.
 - ❖ Clips are being inspected and retightened to the manufacturer's recommendations at the start of each subsequent work shift.



RIGHT WAY FOR MAXIMUM ROPE STRENGTH



WRONG WAY: CLIPS STAGGERED



WRONG WAY: CLIPS REVERSED

INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ When wire rope clips are used on suspension scaffolds, ensure:

❖ U-bolt clips are not being used at the point of suspension for any scaffold hoist.

❖ When U-bolt clips are used, the U-bolt is placed over the dead end of the rope, and the saddle is placed over the live end of the rope.

❖ Make sure suspension ropes are being shielded from heat-producing processes.



RIGHT WAY FOR MAXIMUM ROPE STRENGTH



WRONG WAY: CLIPS STAGGERED



WRONG WAY: CLIPS REVERSED

INSPECTION

➤ Inspecting Suspended Scaffolds.

❑ When wire rope clips are used on suspension scaffolds, ensure:

When acids or other corrosive substances are used on a scaffold, ensure the ropes are:

- ❖ shielded
- ❖ treated to protect against the corrosive substances
- ❖ are of a material that will not be damaged by the substances



RIGHT WAY FOR MAXIMUM ROPE STRESS



WRONG WAY: CLIPS STAGGERED



WRONG WAY: CLIPS REVERSED

INSPECTION

➤ Inspecting Suspended Scaffolds.

☐ Inspecting Hoists

When inspecting hoists check each of the following:

- ❖ Verify the stall load of the scaffold hoist does not exceed 3 times its rated load.
- ❖ When winding drum hoists are used and the scaffold is extended to its lowest point of travel, ensure there is enough rope to wrap four times around the drum.



INSPECTION

➤ Inspecting Suspended Scaffolds.

☐ Inspecting Hoists

When inspecting hoists check each of the following:

- ❖ When other types of hoists are used, make sure the suspension ropes are long enough to allow the scaffold to travel to the level below without the rope end passing through the hoist, or else make sure the rope end provides a means to prevent the end from passing through the hoist.
- ❖ Make sure power-operated and manual hoists have been tested and listed by a qualified testing laboratory.



INSPECTION

➤ Inspecting Suspended Scaffolds.

☐ Inspecting Hoists

When inspecting hoists check each of the following:

- ❖ Ensure gasoline-powered hoists are not used on suspension scaffolds.
- ❖ Check gears and brakes of power-operated hoists used on suspension scaffolds to make sure they are properly enclosed.



INSPECTION

➤ Inspecting Suspended Scaffolds.

☐ Inspecting Hoists

In addition to the normal operating brake, make sure that both power-operated and manual hoists have a braking device or locking pawl which engages automatically when a hoist experiences:

- ❖ instantaneous change in momentum
- ❖ accelerated overspeed episode
- ❖ Verify manually operated hoists have a positive crank force to descend.



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Boatswain's Chairs

Check to make sure boatswain's chair tackle consists of the following:

- ❖ correct-size ball bearings or bushed blocks containing safety hooks
- ❖ properly eye-spliced first-grade manila rope, or other rope of equivalent strength and durability



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Boatswain's Chairs

Inspect seat slings to make sure they:

- ❖ pass through four corner holes in the seat
- ❖ cross on the underside of the seat
- ❖ are rigged to prevent slippage which could cause the chair to be out-of-level



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Boatswain's Chairs

Inspect seat slings to make sure they:

- ❖ are at least 5/8-inch diameter fiber, synthetic, or other first-grade manila rope of equivalent criteria (strength, slip resistance, durability, etc.)
- ❖ seat slings used for gas or arc welding are made of at least 3/8-inch wire rope



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Boatswain's Chairs

Inspect seat slings to make sure they:

- ❖ Check to make sure non-cross-laminated wood chairs are reinforced on the underside with cleats to keep the board from splitting.



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Boatswain's Chairs

Check wood seats for boatswain's chairs to make sure they are:

- ❖ no less than 1 inch thick (if made of non-laminated wood)
- ❖ 5/8-inch thick (if made of marine-quality plywood)



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Multi-Level Suspended Scaffolds

Make sure multi-level suspended scaffolds are equipped with additional independent support lines:

- ❖ equal in number to the number of points supported
- ❖ equal in strength to the suspension ropes
- ❖ rigged to support the scaffold if the suspension ropes fail
- ❖ Ensure support lines and suspension ropes are not anchored to the same points.



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Multi-Level Suspended Scaffolds

Make sure multi-level suspended scaffolds are equipped with additional independent support lines:

- ❖ Check to make sure supports for platforms are attached directly to support stirrups (not to other platforms).



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Float (Ship) Scaffolds

- ❖ Make sure platforms are supported by, and securely fastened to, a minimum of two bearers extending at least 6 inches beyond the platform on both sides.
- ❖ Ensure rope connections do not allow the platform to shift or slip.
- ❖ Check to make sure only two ropes are used with each float.



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Float (Ship) Scaffolds

Make sure ropes are arranged to provide four ends that are securely fastened to overhead supports, and that each rope:

- ❖ is hitched to one end of the bearer
- ❖ passes under the platform and is hitched again at the other end
- ❖ leaves enough rope for supporting ties



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

❑ Inspecting Float (Ship) Scaffolds

Make sure ropes are arranged to provide four ends that are securely fastened to overhead supports, and that each rope:

- ❖ Ensure each employee on a float (ship) scaffold is protected by a personal fall-arrest system.



INSPECTION

➤ Inspecting Special Use Suspended Scaffolds

☐ Inspecting Float (Ship) Scaffolds

Check for the following for maximum intended loads of 750 pounds:

- ❖ Platforms are made of $\frac{3}{4}$ -inch plywood.
- ❖ Bearers are made from 2 x 4-inch or 1 x 10-inch rough lumber, and free of knot and flaws.
- ❖ Ropes have a strength equivalent to at least 1 inch-diameter, first-grade manila rope.





SCAFFOLDING INSPECTION TRAINING

Prepared by TRAINING DEPARTAMENT

