

Tube and Coupler Scaffolds — Planning and Design

Workers building scaffolds risk serious injury from falls and tip-overs, being struck by falling tools and other hazards, and electrocution from energized power lines. Before starting any scaffold project, the employer should conduct a hazard assessment to ensure the safety of workers.

A tube and coupler scaffold has a platform(s) supported by tubing, and is erected with coupling devices connecting uprights, braces, bearers, and runners (see Fig. 1). Due to their strength, these scaffolds are frequently used where heavy loads need to be carried, or where multiple platforms must reach several stories high. These scaffolds can be assembled in multiple directions, making them the preferred option for work surfaces with irregular dimensions and/or contours.

Scaffold Planning

Review blueprints, work orders, the project schedule and other written requirements to determine where these scaffolds should be used. Next, select the right size scaffold for each job. Scaffolds are generally rated as light, medium or heavy duty. Light-duty scaffolds can support a limited number of workers and hand tools (25 lbs. per sq. ft.). Medium-duty scaffolds must be able to safely hold workers, hand tools, and the construction materials being installed (50 lbs. per sq. ft.). Heavy-duty scaffolds must support workers, tools and the weight of stored materials (75 lbs. per sq. ft.).

The following factors should be considered in the planning phase:

- The shape and structure of the building to be scaffolded.
- Distinctive site conditions and any special features of the building structure in relation to the scaffold (i.e., overhead electric power lines or storage tanks). Also consider the proximity and condition of surrounding buildings.
- Weather and environmental conditions.
- Fall protection requirements for workers using scaffolds, such as guardrail systems or personal fall arrest systems.

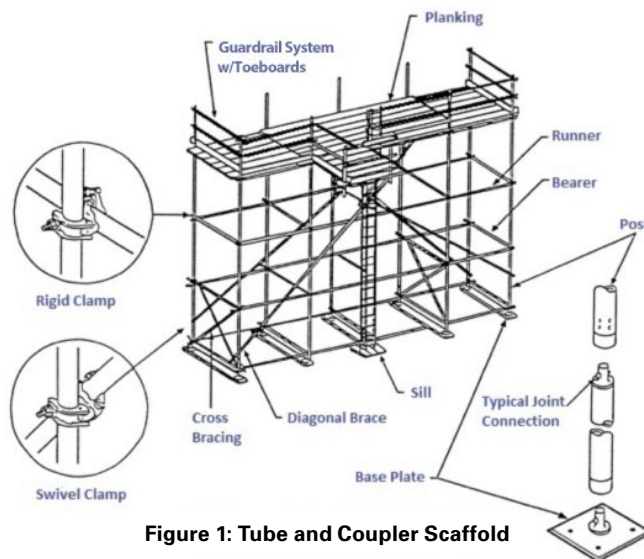


Figure 1: Tube and Coupler Scaffold

- The type and amount of scaffold equipment needed to access all areas to be worked on.
- Proper storage and transporting of scaffolding components, materials and equipment.
- The manner in which workers will access the scaffold (i.e., via ladders, stair rail systems, etc.).

Design

Scaffolds must be designed by a qualified person. Tube and coupler scaffolds over 125 feet (38 m) in height must be designed by a registered professional engineer. Tube and coupler scaffold design must comply with 29 CFR §§ 1926.451–.452. The scaffold design must include:

- Proper materials to construct the scaffold.
- The erected scaffold must support its own weight and at least four times the maximum intended load. To accomplish this, the scaffold design must incorporate a realistic assessment of maximum intended loads on the scaffold at all stages of erection and loading. For example, if wrapped with mesh,

will the scaffold support expected wind loads? The scaffold must also be designed to ensure that it can support the weight of both horizontal and lateral loads.

- Construction and loading must comply with engineered designs and manufacturers' requirements.
- Guardrails and toeboards.
- The amount of time needed to erect and dismantle the scaffold.

For more information on scaffolding, see OSHA's Safety and Health Topics page at www.osha.gov/SLTC/scaffolding.

Contact OSHA

For more information, to report an emergency, fatality or catastrophe, to order publications, to file a confidential complaint, or to request OSHA's free on-site consultation service, contact your nearest OSHA office, visit www.osha.gov, or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

Worker Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For more information, see [OSHA's Workers page](#).

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U.S. Department of Labor

Tube and Coupler Scaffolds — Erection and Use

Workers building scaffolds risk serious injury from falls and tip-overs, being struck by falling tools and other hazards, and electrocution from energized power lines. Before starting any scaffold project, the employer should conduct a hazard assessment to ensure the safety of workers.

A tube and coupler scaffold has a platform(s) supported by tubing, and is erected with coupling devices connecting uprights, braces, bearers, and runners (see Fig. 1). Due to their strength, these scaffolds are frequently used where heavy loads need to be carried, or where multiple platforms must reach several stories high. These scaffolds can be assembled in multiple directions, making them the preferred option for work surfaces with irregular dimensions and/or contours.

When Erecting a Scaffold

- Use footings that are level, sound, rigid and capable of supporting the load without settlement or displacement.
- Plumb and brace poles, legs, posts, frames, and uprights to prevent swaying and displacement.
- Position the first level of bracing as close to the base as possible.
- Plumb and level the scaffold as it is being erected.
- Fasten all couplers and/or connections securely before assembling the next level.
- Install guys, ties, and braces according to the manufacturer's recommendations.
- Do not intermix scaffold components from different manufacturers, unless you can do so while maintaining the scaffold's structural integrity.
- When platform units are abutted together to create a long platform, each abutted end must rest on a separate support surface.
- Once erected, provide toeboards on all railed sides to prevent falling object hazards.

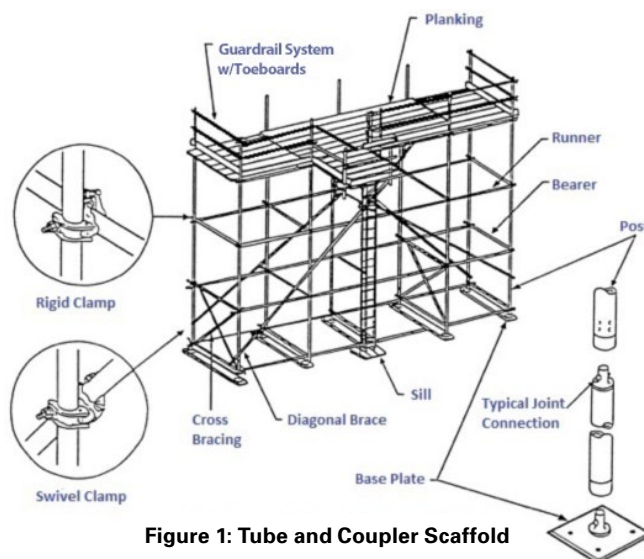


Figure 1: Tube and Coupler Scaffold

When Using a Scaffold

- Make sure that a competent person inspects the scaffold before each work shift.
- If during the inspection a defect or damage to the scaffold is discovered, the scaffold must be tagged out and not used until repairs are made. Attach tags at the access point to the scaffold.

One common tagging system uses the following tags:

Red tag indicates: unsafe, do not use.

Green tag indicates: ready to use.

- Use scaffolds according to the manufacturer's instructions.
- Never load a scaffold beyond its maximum intended load or rated capacity.
- Do not use makeshift methods to increase the working height of the scaffold platform, such as with ladders, buckets or blocks.



- Employees must not work on platforms covered with snow, ice, or other slippery material.
- The employer must provide suitable access to and between scaffolds, such as portable ladders, hook-on ladders, attachable ladders and stairway-type ladders.

When Dismantling a Scaffold

Check to ensure that the scaffold has not been structurally altered in a way which would make it unsafe. Before beginning dismantling procedures, reconstruct and/or stabilize the scaffold as necessary.

Training Workers

Only trained and authorized persons should be allowed to use a scaffold. This training must be provided by a qualified person who understands the hazards associated with the type of scaffold being used and who knows the procedures to control or minimize those hazards. Training must include how to safely:

- Use the scaffold, handle materials on the scaffold and determine the maximum load limits when handling materials.
- Recognize and avoid scaffolding hazards such as electric shock, falls from heights, and being hit by falling objects.
- Erect, maintain and disassemble fall and falling object protection systems.

Erectors and dismantlers of tube and coupler scaffolds are at particular risk because their work starts before ladders, guardrails and platforms are completely installed. These workers must also be trained to:

- Recognize scaffold hazards.
- Properly erect, move, operate, repair, inspect, maintain and disassemble the scaffold;
- Identify the maximum load-carrying capacity and intended use of the scaffold.

Employers should train workers on the following safety factors:

- The shape and structure of the building to be scaffolded.

- Distinctive site conditions and any special features of the building structure in relation to the scaffold (i.e., overhead electric power lines or storage tanks). Also consider the proximity and condition of surrounding buildings.
- Weather and environmental conditions.
- Fall protection requirements for workers using scaffolds, such as guardrail systems or personal fall arrest systems.
- The type and amount of scaffold equipment needed to access all areas to be worked on.
- Proper storage and transporting of scaffolding components, materials and equipment.
- How to access the scaffold, (i.e., via ladders, stair rail systems, etc.).

Workers building scaffolds risk serious injury from falls and tip-overs, being struck by falling tools and other hazards, and electrocution from energized power lines.

To avoid scaffold hazards, employers must:

- Ensure that a competent person supervises and directs workers erecting, moving, dismantling, or altering a scaffold.
- Provide a safe means of access for each worker erecting or dismantling the scaffold. As early as possible, install hook-on or attachable ladders.
- Ensure that workers do not climb diagonal braces to reach the scaffold platform.
- Provide fall protection for workers erecting or dismantling the scaffold.
- Secure scaffolds to the structure during erection and dismantling.

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Narrow Frame Scaffolds

Narrow frame scaffolds, also known as Baker/Perry style scaffolds, are among the most popular pieces of construction equipment. Due to their versatility many contractors use them instead of ladders because they allow workers to maintain their balance and work more easily from the platform.

What is a narrow frame scaffold?

A narrow frame scaffold has wheels and is often used as a mobile scaffold with the end frame measuring 3 feet or less in width. (See Fig. 1.) Designed to be easily moved, they are used for operations such as painting, drywall installation, plastering, and other jobs where workers must frequently change position. Scaffolds can be adapted to stairs, ramps, and other uneven surfaces.

In some instances scaffolds may be a better and safer choice than ladders.

Minimizing hazards

Some of the hazards associated with narrow frame scaffolds, *can lead to personal injury or death; they include:*

- Falls from an elevated level
- Tip-overs
- Electric shocks
- Structural failures (collapse)

Training workers in scaffold safety

Under the *Occupational Safety and Health Act* employers are responsible for providing a safe workplace.

All training must be conducted in a manner and language which the worker is able to understand.

- Only trained and authorized persons should be allowed to use a scaffold. This training must be provided by a qualified person who recognizes the hazards associated with the type of scaffold being used and who

understands the procedures to control or minimize those hazards. Training must include how to safely:

- Use the scaffold and determine the maximum load limits when handling materials.
- Recognize and avoid scaffolding hazards such as electric shock, falls from heights, and being hit by falling objects.
- Erect, inspect, move, operate, maintain, and repair scaffolds.



Figure 1

For more information on scaffolding, see OSHA's Safety and Health Topics page at www.osha.gov/SLTC/scaffolding.

Scaffold Safety

Employers must ensure the following:

- Follow the manufacturer's allowable load for the casters, scaffold components and platforms, along with recommended bracing to ensure a rigid and structurally sound scaffold.
- Assess the work area, site conditions, and work to be performed.
- Conduct a pre-operation inspection to verify that all scaffold components are functioning properly and/or are correctly assembled.
- Keep the platform free from tripping hazards such as hand tools, equipment, or materials.
- Lock scaffold wheels with positive wheel and/or wheel and swivel locks to prevent movement while in use.
- Use guardrails which include top rails, mid-rails, and toe boards, or fall protection at working platform heights of 10 feet or higher.
- Stay at least 10 feet away from energized power lines.
- If outriggers are installed, deploy installed outriggers on both sides of the scaffold. All locking pins must be engaged before using the scaffold.

Employers must ensure that workers have been effectively trained in the following:

- Not to stand on the guardrail or use any components of the scaffold or other items (e.g., stepladders, buckets, boxes, barrels, etc.) inside the scaffold to gain additional standing height.

- Not to try to pull yourself from one location to another while standing on the platform.
- Not to use a scaffold if it is incomplete, broken or has missing or ill-fitting parts which need replacement. Contact your employer immediately.
- Not to move the scaffold with worker(s) on the scaffold when:
 - The worker(s) on the scaffold is unaware of the move and/or the surface under the scaffold is not within 3 degrees of level and free of pits, holes or obstructions.
 - The worker is on any part of the scaffold which extends outward beyond the wheels, casters, or other supports.
 - Manual force is not being applied as close to the base as practicable. Manual force must be applied not more than 5 feet above the supporting surface (1926.452(w)(3)).
 - The height to base width ratio of the scaffold during movement is greater than 2 to 1, unless the scaffold is designed and constructed to meet or exceed nationally recognized stability test requirements (such as ANSI/SIA A92.5 and A92.6) (1926.452(w)(6)(ii)).

Retraining

Employers must retrain employees when inadequacies are observed, changes in worksite conditions occur or when it is believed that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of the scaffold.

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Weekly Pre-Task Plan + Toolbox Talk Sign-in

Identify tasks relating to the safety training onsite, or experienced in the past.

Task		Hazards Identified		Control Methods	
Describe upcoming tasks		Describe task hazards		How will you monitor and control hazards?	
Other Hazards to Monitor					
Slips, Trips		Grinding – guards/face shields		Lockout/Tagout or Linebreak	
Falls over 6' + Holes		Cuts, Abrasions, Pinches		Electric Shock/Live Utilities	
Falls from Ladder / Elevated Work/ Lifts		Heavy Equipment / Crush hazards		Extreme weather + exit plans	
Fall Harness – trained to use?		Sprains/Strains/ Overexertion		Fires / chemical storage	
Falling Objects/ Overhead Work		Crane Lifts			
Hot Work: PERMIT		Confined Space: PERMIT		Trenches/Excavations	
Flammables, Fire extinguishers, Cylinders up + secure, Ventilation		Air Monitoring, Ventilation, Rescue Plan, Attendant, Entrant, Hazards, eliminated		Competent person inspect daily. Ladder-4', Slope 5'	

Inspections-check if required	Inspected by:
Lifts, Hoists, Heavy Equip.	
Ladders/ Scaffolds	
Trenches	
Tools + Equipment	
Fall protection equip.	
Guardrails/barricades/holes	

Additional Notes/reminders:

[illegible]