WORKING AT ELEVATED PLACES
Scaffolds Standard

1.0 INTRODUCTION

University workers who require access to elevated locations while performing work are faced with a potential risk of falling. Scaffolds provide a safer means of accessing work surfaces that have limited footing (e.g., exterior windows of a building). They are also a safer alternative to using ladders for providing temporary access to work areas (e.g., extension ladders). Proper use of scaffolds is essential to minimize the risk of falling.

The main hazards when working with scaffolds are:

- Erecting and dismantling scaffolds;
- Climbing up and down scaffolds;
- Planks sliding off or breaking;
- Improper loading or overloading;
- Platforms not fully planked or "decked";
- Platforms without guardrails;
- Failure to install all required components, such as base plates, connections, and braces;
- Moving rolling scaffolds near overhead electrical wires; and
- Moving rolling scaffolds with workers on the platform.

2.0 APPLICATION

This standard applies to any worker who uses a scaffold during the course of their work at the University. This standard does not apply to suspended scaffolds or elevated work platforms.

***Note**: In this standard, "worker" includes faculty, staff, students, contractors, and visitors.*

This standard outline that minimum requirements for scaffold systems as prescribed by Ontario regulation 213/91: Construction Projects. For additional information on best practices for the safe erection, use, and inspection of scaffold systems, in addition to training and fall protection, refer to the CAN/CSA-Z797-18: Code of Practice for Access Scaffold.

3.0 DEFINITIONS

Competent person	Defined as someone: a) Qualified because of knowledge, training, and experience to organize the work and its performance; b) Familiar with the Occupational Health and Safety Act (OHSA) and the regulations that apply to the work; and c) Who has knowledge of any potential or actual danger to health or safety in the workplace.
Guardrail system	An assembly that provides a barrier to prevent a worker from falling from an edge of a surface.

Fall arrest system	Any fall protection system that permits a limited free fall (stop and suspend). This system comprises an assembly of components joined together such that when the assembly is connected to a fixed support, it can arrest a worker's fall.
Fall protection system	Any system that serves to protect a worker from falling or minimizes the travel distance in the event of a fall.
Travel restraint system	Any fall protection system that limits travel in a manner such that free fall is not possible. This system comprises an assembly of components capable of restricting a worker's movement on a work surface and preventing the worker from reaching a location from which they could fall.
Scaffolds	Temporary structures used to support workers and/or materials during construction, repair, or maintenance operations. They can be simple single level scaffold on wheels to more advanced multi-level systems equipped with stairs and other components.
Unprotected sides and edges	Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., work platform where there is no wall or guardrail system.

4.0 ONTARIO LEGISLATION AND REQUIREMENTS

Section 126 to 136 of the Regulation for Construction Projects (O. Reg. 213/91), under the Occupational Health and Safety Act of Ontario, outlines the design and construction requirements for scaffolds and scaffold platforms on construction worksites.

The Construction Regulation also specifies that fall protection systems are required where workers may be exposed to fall hazards. Fall hazards that may be associated with scaffold systems include:

- Falling more than 3 metres;
- Falling more than 1.2 metres, if the work area is used as a path for a wheelbarrow or similar equipment;
- Falling into operating machinery;
- Falling into or onto a hazardous substance or object; and
- Falling through an opening on a work surface.

In addition, Ontario Regulation 851 (Regulation for Industrial Establishment, as amended) requires that a worker must be equipped with a fall arrest system when exposed to a risk of falling more than 3 metres.

5.0 UNIVERSITY OF TORONTO REQUIREMENTS

In accordance with Ontario Regulations 213/91 and 851, the University of Toronto requires that workers who use scaffolds must receive fall protection and fall rescue training. In addition, workers must receive both theoretical and practical training on the specific scaffold system they are required to use for their work.

Please refer to the University of Toronto Working at Elevated Places Standard – Working on Roofs or at Heights for information on education and training requirements related to working at heights.

6.0 SELECTION OF SCAFFOLDS AND PLANNING OF WORK

The proper planning and selection of the type of scaffolding requires knowledge of the site conditions and work to be done. Consider the following:

- Weight of workers, tools, materials, and equipment to be supported by the scaffold;
- Site conditions (e.g., indoors/outdoors, type and condition of surfaces and walls, equipment access, variations in elevation, location of suitable tie-ins to the building or structure, proximity to vehicle/pedestrian traffic);
- Height of scaffold required;
- Type of work to be done from scaffold (e.g., masonry, painting, mechanical installation, suspended ceiling installation, etc.);
- Duration of work;
- Requirements for pedestrian traffic through and under the scaffold;
- Anticipated weather conditions (e.g., wind speed, direction);
- Ladders or other access to the platform;
- Obstructions;
- Electrical hazards;
- Configuration of the building or structure being worked on;
- Special erection or dismantling problems, including practicality of providing fall protection;
- Need to remove guardrails to provide working access or handle materials;
- Use of mechanical equipment to aid in erecting the scaffold; and
- Experience of supervisor and workers with the types of scaffolds available.

7.0 PERSONAL PROTECTIVE DEVICES

Section 26 of the of the Regulation for Construction Projects (O. Reg. 213/91) requires that workers who are exposed to a fall hazard – such as when erecting, using, or dismantling scaffolds – must be protected from falling using a guardrail system. If that is not practicable, workers must be protected by the highest-ranked method that is practicable (shown below in order of preference):

1. Travel restraint system
2. Fall restricting system
3. Fall arrest system
4. Safety net

In addition to fall protection, workers must wear protective headwear and footwear as required (Section 22 and 23, O. Reg. 213/91).

8.0 ROLES AND RESPONSIBILITIES

Principal investigators/supervisors and all others in authority shall:

- Identify situations where scaffolds are required;
- Determine using this standard or in conjunction with Environmental Health and Safety the appropriate type of scaffold for a specific application. See Appendix B for Basic Types of Scaffold Systems;
- Provide the appropriate scaffold and any additional equipment required, including all assembly instructions, plans and specifications;
- Appoint a competent person to:
    - Supervise the assembly, alteration, and dismantling of a scaffold;
    - Inspect a scaffold following erection (prior to first use) and after moving; and
    - Supervise the work taking place on the scaffold.
- Ensure engineered scaffolds are constructed in accordance with design or erection drawings, manufacturer's specifications and supplier's literature, and good building practices;
    - Ensure engineered scaffolds are inspected by the person responsible for the design drawings or their delegate;
- Ensure that workers are protected during erecting/dismantling of scaffolds at heights above 3 metres by a (1) guardrail system or a (2) fall protection system when a guardrail system is not reasonable possible to install.
- Ensure that workers are informed of the proper use of and maintenance of scaffolds, and any applicable safety devices;
- Ensure that workers follow appropriate usage practices for scaffolds;
- Where any travel restraint or fall arrest system is required, ensure that workers have been trained on the proper use of and maintenance of the system [refer to the UofT Working at Elevated Places (Including Working on Roofs and At Heights) Standard];
- Where applicable, communicate the scaffold status through the use of tags or other method, for example:
    - Red: "Danger: Do Not Use Scaffold"
- Communicate potential hazards related to the scaffold to all workers prior to use;
- Take scaffold out of service if it is determined to be unsafe for use; and
- Maintain records of worker training.

Workers shall:

- Receive proper training and instructions (theory and practical) on safe erection, inspecting, working on, and dismantling of the scaffold;
- Receive proper training and instructions (theory and practical) on working at heights, fall protection systems, and fall rescue procedures;
- Use scaffolds in a manner consistent with their training at all times;
- Use any protective devices or equipment as required;
- Maintain scaffolds in good condition; and
- Report any defects to their supervisor.

9.0 SCAFFOLDS

For most applications involving internal UofT staff around the University, pre-fabricated metal scaffolds are rented or purchased and then erected. Where scaffolds are built on-site, they must be constructed of suitable structural materials. Some important directions regarding structural features of a scaffold include the following:

- Ground surfaces that the scaffold is to be used on must provide adequate support for loads applied;
- Every scaffold shall be designed and constructed to support two times the maximum load to which it will be subjected to without exceeding allowable stresses on its components and four times the maximum load to which it will be subjected to without overturning;
- All scaffold sections must be braced diagonally in the horizontal and vertical planes, in a manner that prevents any lateral movement;
- Horizontal members of all scaffolds shall be secured to prevent lateral movement and shall not have splices between the points of support;
- Scaffolds must have safety catches on all hooks;
- All points of assembly shall be secured by pins or other means to prevent separation of components;
- Where the height of a scaffold exceeds three times its smallest lateral base dimension, the scaffold must be stabilized by (1) attachment to a building or structure by means of ties (“tied-in”) or (2) attachment to a support surface using guy wires;
- All scaffolds shall be secured at vertical intervals not exceeding more than three times the smallest base dimension, to prevent lateral movement;
- Engineered scaffolds must be accompanied by design drawings (stamped by a professional engineer), specifications, the rated load, and written instructions on the safe use, assembly, maintenance and dismantling of the scaffold;
- Ensure all scaffold components are inspected prior to and during scaffold erection (see Appendix A);
- Ensure all scaffold components are used, properly installed, and installed in sequence;
- Scaffolds equipped with castors or wheels must have a braking device on each castor or wheel (e.g., brake and swivel lock), to be applied when a worker is on the scaffold;
- As a minimum requirement, a rolling scaffold (i.e., mounted on castors or wheels) that is more than three times the height of the smallest base dimension requires a form of additional support, such as outrigger stabilizers, to increase the base dimension and allow a greater maximum height;
- Scaffolds must be leveled using stable objects that will support twice its maximum load and protect the scaffold from settling, displacement or deformation;
- Overhead protection must be provided where there is or will be work above; and
- Maximum allowable load (duty rating) of the scaffold must be made known to the workers in writing.

10.0 SCAFFOLD PLATFORMS

- Take into account the weight of the workers, tools, and materials to be supported when selecting the platform material;
- The scaffold platform must be rated to support all loads to which they will be subjected to in a particular application;
- Platform material (i.e., planks) should meet the minimum requirements for duty rating, dimensions, material grade, and must not be painted;
- Only planks designated by the manufacturer to be used as scaffold planks can be used on platforms;
- Scaffold platforms must be at least 460 mm wide;
- All platforms above 2.4 m must be fully planked (‘fully decked”); and

- Work platform shall have each component secured against slipping from its supports.

11.0 SCAFFOLD GUARDRAILS

- Scaffold work platforms must have a guardrail system (top rail, mid-rail, and toeboard) where:
  - A worker has access to the perimeter or an open side of the work surface and may fall more than 2.4 m;
  - A worker may fall more than 1.2 m, if the work platform is used a path for equipment;
  - A worker may fall through an opening on a work surface;
  - A worker may fall onto a hazardous substance or object, regardless of the height.

- A guardrail should consist of:
  - A top rail that must be at least 0.9 metres but not more than 1.1 metres above the surface of the platform;
  - A mid-rail about halfway between the platform and the top rail;
  - A toeboard at least 89 mm (approx. 9 cm) high at the platform level if made from wood;
  - Guardrail posts no more than 2.4 m apart if made from wood. Guardrail posts can be farther apart if the materials used are adequate to support the loads specified.
- Guardrails made of wood, must be made of spruce, pine or fir timber of construction grade quality or better;
- The guardrails must be capable or resisting all loads to which they will be subjected to; and
- Shall not have any unguarded openings.

12.0 SCAFFOLD LADDER, RAMP, AND STAIRWAY

- A built-in or dedicated means of access, such as a ladder, ramp, or stairway must be provided;
  - Ladder rails should extend at least 1 m above the platform of the scaffold;
  - Vertical ladders can reach up to 9 m, but above 2.2 m they require a safety cage;
  - Scaffolds in excess of 9 m should have built-in stairs with rest platforms/stations at intervals no greater than every 9 m.
- Clear debris, extension cords, and tools away from areas around the top and bottom of ladders. Store materials away from these locations.

13.0 GUIDELINES FOR SCAFFOLDS

Construction of Scaffolds

Construction of scaffolds from raw materials requires a knowledgeable and experienced individual familiar with all relevant legislation and practices. Scaffold construction should never be attempted by those not intimately familiar with this process. Minimum requirements are detailed in the Construction Project Regulations (O. Reg. 213/91) made under the Ontario Occupational Health and Safety Act.

Location

Before erecting a scaffold, examine the location for:

- Ground conditions (e.g., hard/soil surfaces, slopes);
- Overhead wires;
- Obstructions;
- Variation in surface elevation; and
- Tie-in locations and methods.

Erection and Dismantling of Scaffolds

Proper erection and dismantling of pre-fabricated scaffold is crucial for the safety of individuals working on or around them. Erection and dismantling of scaffolds should meet the following requirements:

- Fall protection equipment (i.e., full body harness and lanyard) must be used during erection/dismantling of scaffolds at heights above 3 metres when guardrails are not in place;
- Erection/dismantling must be conducted according to the manufacturer's instructions;
- Erection/dismantling must be supervised by a competent person;
- All required parts must be in place, and the structure inspected by an engineer or competent person before a scaffold is used;
- Maintain minimum safe approach distance from energized electrical conductors (Appendix C);
- Competent person carrying out the inspection must state in writing that the scaffold is erected in accordance with the design drawings; and
- Design drawings and written statement for the scaffold must be kept at the project site.

Scaffold Use

General Points

- If possible, materials to be loaded onto a scaffold work platform from the ground by a forklift or other device should be done without personnel on the scaffold;
- Loads of working materials should be distributed evenly across the working platforms, and never be placed outside the frame on overhangs unless there is an outrigger specifically designed for such purpose;
- Maintain planks in good condition (i.e., no weak areas, deterioration, or cracks). Planks with defects should not be used as scaffold material and should be destroyed. Inspect scaffold planks regularly;
- Care must be taken when heavy loads, such as masonry cubes, are placed on the work platform. Heavy loads must be placed directly over the scaffold frame;
- If the nature of the work prevents the use of a guardrail where required, or the guardrails must be temporarily removed to allow material to be received on the platform; fall protection equipment must be used;
- Work platforms and access ways must be kept clean and clear of materials that may cause a person to lose their footing;
- Set up a plan for handling waste materials;
- If work on the scaffold is likely to result in debris falling, then cordon off the scaffold to prevent workers from entering the area;
- Scaffolds must not be used outdoors in adverse weather conditions, such as high winds, lightning storms, etc.
- Workers handling materials or equipment while working on the scaffold must take care to avoid electrical contact;
- Workers should have both feet on the platform. Standing on objects (e.g., barrel, box, step ladder, guardrail, etc.) to gain extra height is prohibited.
- Use proper climbing techniques (3-point contact) when climbing up/down scaffold ladders and stairs. Do not carry tools or materials by hand when climbing ladders/stairs. Always face the ladder when climbing and always keep the body's centre of gravity between the two ladder rails.

Rolling (Mobile) Scaffolds

- Care must be taken while moving a rolling scaffold to avoid ground depressions, curbs, or other hazards that may cause the scaffold to overturn. Check the path for debris and clearance from energized conductors or other obstructions;
- Maintain safe distance from overhead powerlines while moving scaffolds (see Appendix C). Check the route to ensure no overhead wires are in the immediate vicinity. Partial dismantling may be necessary in some situations;
- Rolling scaffolds must not be moved while persons, work materials, or equipment are on them;
- Scaffolds equipped with pneumatic tires (e.g., farm wagon-type) must not be supported by these tires while being erected, used or dismantled. Scaffold should be resting on outriggers with levelling devices when workers are aboard; and
- Scaffolds equipped with castors or wheels shall have the braking device applied on each wheel or castor locked during erection, use by workers, or dismantling, and should be additionally chocked.

14.0 RESOURCES

1. CAN/CSA-Z797-18: Code of Practice for Access Scaffold
2. Infrastructure Health and Safety Association, Publication M029: Construction Health and Safety Manual (2019 Edition), Chapter 21 - Scaffolds
3. University of Toronto: Working at Elevated Places Standard – Working on Roofs or at Heights

APPENDIX A

INSPECTING SCAFFOLD EQUIPMENT AND COMPONENTS

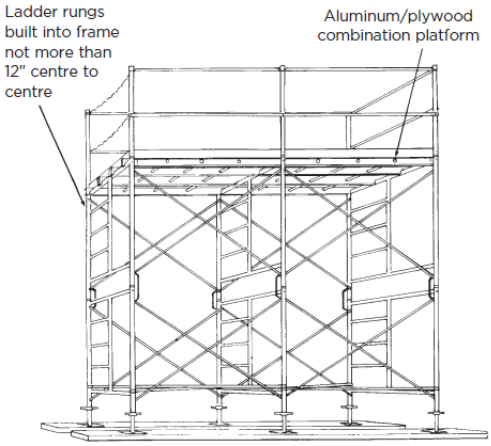
All scaffolding equipment and components must be carefully inspected before use to ensure that it is serviceable and in good condition. Damaged or deteriorated equipment must be removed from service. The inspection of the equipment should include the following:

- Presence of all necessary components for the job;
- Compatibility of components;
- Check for damage, bends, or severe rusting on structural components;
- Check for cracks around welds, joints, or around the circumference;
- Check moving parts, such as gravity locks, for freedom of movement;
- Check for brackets with deformed attachment hooks;
- Check the holes in the cross braces for splitting out;
- Check manufactured planking for missing hooks, locks, or rivets; bent siderails; or a damaged walking surface. If the surface is plywood, check for splits, knots, and dry rot areas;
- Check castors for damaged brakes, axles, or stems;
- Look for any painted area that appears blistered, cracked, or crazed, which may indicate prior damage; and
- When in doubt about the condition of scaffold equipment, either discard the component or consult with the scaffolding supplier.

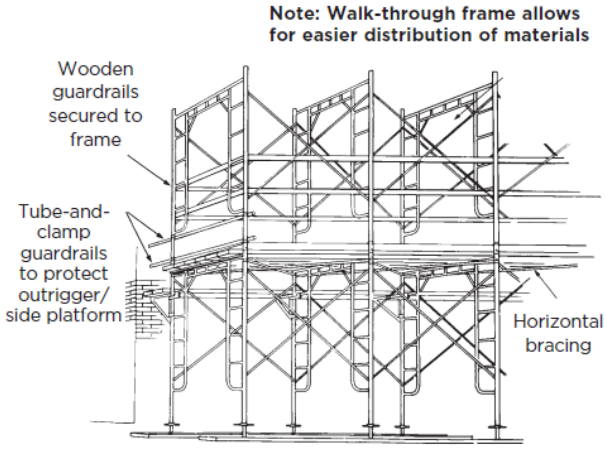
Do not use scaffold equipment or accessories that are obviously damaged. Do not use rusty or corroded scaffold equipment. If any areas show pitting, flaking, powdering, or excessive rust, discard the equipment.

APPENDIX B

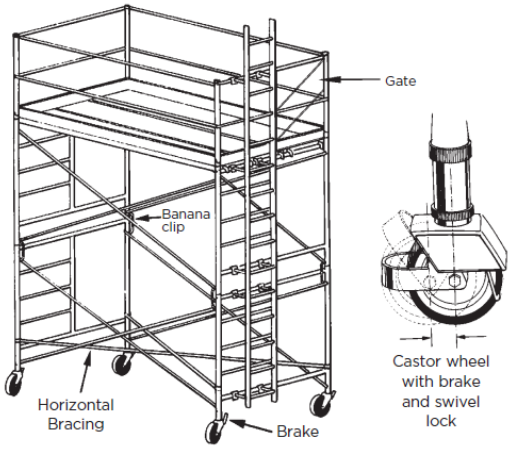
BASIC TYPES OF SCAFFOLD SYSTEMS



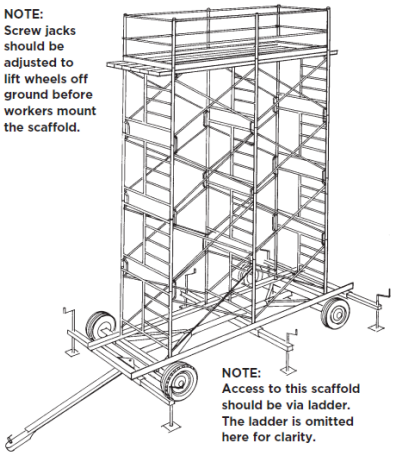
Standard Tubular Frame Scaffold



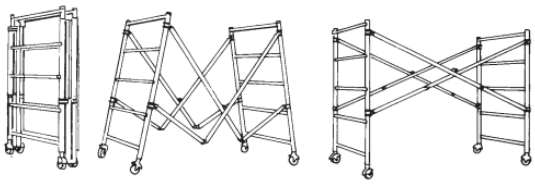
Standard Walk-Through Frame Scaffold



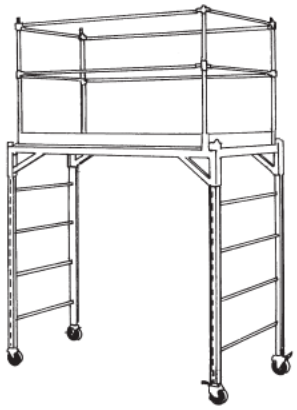
Castor-Type Rolling Scaffold



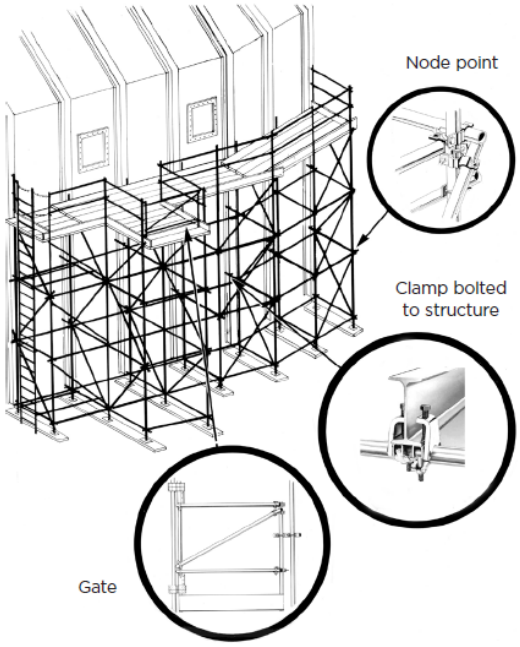
Farm Wagon-Type Rolling Scaffold



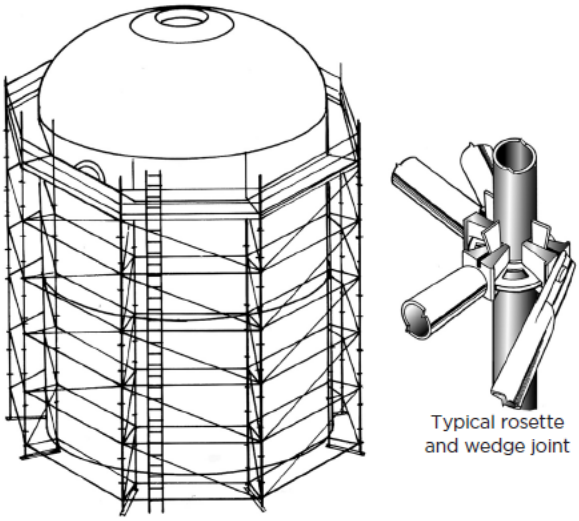
Fold-Up Scaffold



Adjustable-Height Scaffold



Tube-and-Clamp Scaffold



Systems Scaffold

Reference: Infrastructure Health & Safety Association, Construction Health and Safety Manual, Chapter 21 - Scaffolds.

APPENDIX C

MINIMUM SAFE APPROACH DISTANCE FROM ENERGIZED OVERHEAD ELECTRICAL CONDUCTORS (POWERLINES)

Voltage Rating of Powerline (in volts)	Minimum Safe Distance (in metres)
> 750 to ≤ 150,000 volts	3 m
> 150,000 to ≤ 250,000 volts	4.5 m
> 250,000 volts	6 m

Reference: From Section 188, subsection 2 in O. Reg. 213/91: Regulation for Construction Projects.