DALHOUSIE UNIVERSITY

**Department of**
**Facilities Management**
**Occupational Health and Safety**

# Safe Job Procedure for Erecting Access Frame Scaffolding

**Application**

This safe job procedure applies all shops or trades that use scaffolding.

**Known Hazards**

- Falling objects
- No, or, improper supervision
- Not using required safety parts and accessories.
- Improper use of parts
- Loose, cracked, broken, missing, bowed, corroded or worn parts.
- Excess weight
- Bad weather conditions
- Unstable footings
- Improperly braced or secured platforms and / or planking.
- Poorly installed toe boards or railings.
- Irresponsible behavior or actions
- Electrical shock from contact with power lines.
- Scaffold collapse
- Falling from scaffolding
- No, or improper training in scaffold erection.
- Unsuitable access or egress points

**Job Specific Training Requirements**

- Erection, Alteration, Dismantling and Proper use of Scaffolds
- Fall Protection
- Proper training in the use of all required PPE
- Proper training in the use of all required tools and equipments.

**Applicable Regulations / Standards / Procedures**

- Nova Scotia Fall Protection and Scaffolding Regulations
- CSA Standard CSA Z797, “Code of Practice for Access Scaffold”
- CSA Z91, “Health and Safety Code for Suspended Equipment Operations”
- CSA Z271, “Safety Code for Suspended Platforms”.
- Safe Job Procedures for tools and equipment that are to be used.

The following regulations are to be referenced when assembling or dismantling scaffolds and a risk of falling exists:

- CSA Standard Z259.1-1995 “Fall Arresting Safety Belts and Lanyards for the Construction and Mining Industries”
- CSA Standard Z259.10-M90, “Full Body Harness”
- CSA Standard Z259.11-M92, “Safety Belts and Lanyards”
- CSA Standard Z259.2-M1979, “Fall Arresting Devices, Personnel Lowering Devices and Life Lines”

- ANSI Standard A10.11-1989, “Safety Nets Used During Construction, Repairs and Demolition Operations”

## Personal Protective Equipment Requirements

- Eye Protection
- Hearing Protection
- Protective Footwear
- Hard Hats
- Work Gloves
- Full Body Harness and Life Lines
- Any other PPE required by the hazard assessment for the job.

## Safe Job Procedure

**Job steps are listed in the order in which they must be completed. Key activities follow each step. Key steps and the associated activities must be followed in the order presented to achieve maximum efficiency in safety, production, quality and overall loss prevention.**

### Before erecting access frame scaffolding the following issues must be considered and properly addressed:

- What height of scaffolding is required? Will additional frames be added as work progresses?
- Facilities Management recommends scaffolding greater that 9.0 meters (30 feet) in height shall be erected by a competent scaffold contractor.
- Access frame scaffolding that exceeds a height of 15 m (49 ft) from its base support to the uppermost platform shall be described by and erected in accordance with design drawings.
- Assess the type of work to be done, how many people will be working on the scaffold and how much the required equipment and materials will weight.
- Is frame scaffolding the best scaffold for the work to be performed?
- Is the ground, or other surface that the scaffold will stand on, firm enough to support the weight of the scaffold, equipment and materials and any employees working on the scaffold?
- Will the scaffold require guy wires, outrigger stabilizers or some other means of support to ensure it is safe from tipping?
- Are there adequate fastening points for guy wires / scaffold ties and are there firm surfaces for stabilizers to sit on?
- Will the scaffolding be covered or otherwise enclosed to provide employees with protection against weather conditions?
- How will employees access and exit the scaffold, and, will they be able to do so safely?

- If the scaffold is to be more than one level, how many levels will be loaded with materials? Should an engineer be requested to design additional scaffold safety features to accommodate the calculated total load?

- If a rolling scaffold is being used refer to the section on Rolling Scaffolding.

## Requirements that must be met when erecting frame scaffolding:

- Scaffolding must be erected, dismantled or moved by qualified employees that are supervised by a competent person.

- Ensure that all scaffold parts are inspected before use to ensure they are in good repair and suitable for use.

- Ensure the surface on which the scaffold will be erected is firm, level and capable of supporting the load of the scaffold, workers, materials and equipment that will be use at any given time.

- If necessary, prepare the site using compacted crushed rock, etc. particularly any area where sills will be placed.

- Ensure you use adequate sills and base plates. Sills must be sound, rigid, and capable of supporting the maximum weight to be exerted on the scaffold without settlement or deformation.

- Ensure screw jack bases are only adjusted within the limits specified by the manufacturer, industry standards or relevant regulations.

- Ensure the adjustable bases have no thread damage and the base plates are not curled or warped.

- Ensure the jackscrews have no cracks in the weld where they attach to the top of the caster, no thread damage and the adjusting nut is tight.

- Ensure the end frames have no cracks in the welded joints, the top and bottom cross-members have no kinks or dents, legs are plumb and square, brace locks are in good working condition and coupling pins are in place and secured to the frame.

- Ensure the cross-braces are straight with no bent ends, the pivot connection is in good working order and there is no excessive rust.

- Frames must be plumb and level and spaced to adequately support the loads.

- Locking pins are to be used at all times to prevent separation of components due to ground heave or other actions.

- Platform height must not exceed three times the smallest base dimension of a rolling or free standing scaffold tower. (3 to 1 rule.)

- Any scaffold that exceeds the 3 to 1 rule, in height, must be guyed or securely fastened to a building or other structure to prevent toppling over.

- Where employees are working 3 meters (10 feet), or more, above a safe work surface guardrails must be installed on all of its open sides.

- If the working platform will be under 3.0 meters but over an unsafe surface fall protection is required.

## Key steps to be followed when erecting frame scaffolding:

- Complete a Job or Project Hazard Assessment Worksheet. As a result of the assessment you must be able to address the following:

    - The scope of work to be performed.
    - The scaffold system to be used.
    - Site conditions and hazards. (Include layout and plans)
    - Any special PPE that will be required.
    - Special needs (if any) to be addressed. (Engineering issues, erected should be done by a highly competent person)
    - The need for safe work procedures to be developed.
    - Preparation of an emergency plan.
    - Develop a list of all required materials.

- Ensure the job site where the scaffold is to be erected is level and capable of supporting the scaffolding. Ensure that there are no holes, depressions, rocks or other debris.

- Prepare the ground, or other surface, area where the scaffold will be erected.

- Ensure that sills will be level and make full contact with the supporting surface. (This may include excavating soil and replacing it with a crushed rock base.)

- Assemble all of the scaffold parts and other equipment required at the site where the scaffold will be erected.

- Select and install sills as follows:

    - Sills shall consist of a timber plank having a maximum size of 38 mm x 235 mm (1.5 inches x 9.25 inches) (nominal 2 in x 10 in) or an equivalent member.
    - Sills are to be oriented either along the length or across the width of the scaffold.
    - Sills shall be continuous under at least two legs or standards.
    - Sills shall project at least 0.30 m (I ft.) beyond the bearing point of the leg or standard.
    - Never use planks as scaffold planks if they have been used as sills.

- Ensure that the sill is making good contact along its entire length with the surface under the sill.

- Refer to Clause 5.0 of CSA Z797-09 Code of Practice for Access Scaffolds for additional requirements dealing with soil and hard surfaces and installing sills on slopes.

- Place the base plates or adjustable screw jack plates on the sills at spots that match the dimensions of the scaffold. Do not secure the bases to the sill at this time.

- Base plates or screw jacks must be installed under every leg / standard.

- Ensure that the sills are centered under each screw jack or base plate.
- Always use adjustable screw jacks or base plates to allow for minor adjustments to keep the scaffold plumb and level.
- Starting at the screw jack on the highest point of ground, adjust the screw jack nuts so they are set 2 inches (51 mm) above the top of the sill.
- Insertion of the screw jack into the standard must always be done as recommended by the manufacturer or at least one third of the length of the screw jack.
- Place the first frame on the base at the highest point.
- Connect the first cross brace to the frame and allow the frame to lean forward slightly and rest on the sill (against the down slope screw jack) while you prepare the next frame to be installed.
- Install the second frame on the remaining screw jacks and secure the cross member already in place to the second frame.
- Install the second cross brace to both frames.
- Level and plumb the scaffolding starting at the highest point of the scaffolding, and if possible, use the screw jack to bring the highest corner down closer to the sill.
- Next, bring the remaining three corners up to the level of the highest corner. At this point, if the lower cross braces of each frame are level with each other, the frames should also be plumb.
- Ensure that variation from plumb is within the following tolerance limits:
    - 12.0mm (0.5 of an inch) in 3.0m (10.0 feet)
    - 19.0mm (0.75 of an inch) in 6.0m (20.0 feet)
    - 38.0mm (1.5 inches) in the total height of the scaffold
- The horizontal variation of a scaffold structure must not exceed:
    - 25.0 cm (10 inches) in a 15.0 meter ( 50.0 feet)
    - 50.0 cm (20 inches) in a 30.0 meter (100.0 feet)
- Measure corner to corner to ensure the bay is square and install the (horizontal) diagonal brace to keep the scaffold square.
- Check the level again, plumb if necessary and securely fasten the screw jacks to the sills using appropriate sized nails that are driven at least half way and bet over.
- Install the deck using either an all aluminum platform, specifically designed planks or a wood deck.
    - Any sawn lumber or other material used for scaffold planks must comply with Part 23, Workplace Health and Safety Regulations, Section 23.10 (2) and (3).
    - Extension of planks beyond supporting points, the securing of planks, etc. must comply with CSA Standard CSA Z797, “Code of Practice for Access Scaffold”.

- Any wood planks used for decking must be specifically graded for use on scaffolding.
- Ensure that the deck is secured using cleats so it cannot move.
- Install the guardrail posts on top of the coupling pins seated in the top of the frames.
- Put a pigtail lock through the top and bottom of each coupling pin to avoid any separation.
- Attach the guardrails to the posts on all exposed sides.
- Install toe boards ensuring that the gap between the bottom of the toe board and the top of the platform is no greater than 13mm (1/2 inch).
- Follow the above steps to assemble any additional tiers.
- Start installation of the access ladder.
- **NOTE: Prior to installing or dismantling scaffold tiers above 3.0 meters (9.8 feet) a fall arrest system must be installed.**
- When assembling numerous tiers at least one member of the assembly team must stay at ground level to hand scaffold components to the employee on the work platform and / or to affix a rope to components to be raised to upper tiers.
- Ensure that a rope of sufficient length is available to raise frames and other required parts to the level being assembled. Us a davit and well wheel when ever possible.
- Install end frames so that the integral built in structural supports line up between tiers.
- Ensure that stacked frames are properly seated on couplers and properly pinned to avoid separation.
- Install face, end and plan bracing as recommended by scaffold manufacturer as each level is erected.
- The first level of transoms, ledgers, and plan braces shall be installed as close as possible to, but not more than, 0.45 m (18 in) above the base plates, in order to maintain alignment of the standards.
- Always follow the manufacturer’s recommendations for installation of face, end or plan bracing.
- Use bracing or tie-ins every 4.6 meters (15 feet) vertically and every two bays horizontally as a minimum.
- Continue to add frames as described until the required height is reached.
- Ensure that access to the scaffold by un-authorized people is prevented by enclosing the lower level of scaffolding with plywood, wire fencing or some other secure material.
- Install a doorway in the security enclosure large enough to allow access by authorized employees, and, to bring required tools, equipment and materials into the work area.

- Initiate whatever other security measures are necessary, including WARNING signs, to alert people to hazards and prevent access by unauthorized people.

- Ensure that any scaffold that has not been completed or is not yet safe for use is tagged with appropriate warning signs.

## Guardrails and Toe Boards

Guardrails shall be installed at all open sides and around any uncovered opening in a scaffold platform.

- The top rail shall be installed at a height of 1.0 m ± 75 mm (39 inches ± 3.0 inches).

- A mid-rail must be installed midway between the top railing and the platform.

- A toe board must be installed so that it is securely attached to the posts and the structure to which the posts are secured. The toe board must have a minimum height of 90 mm (3.5 inches), however, a higher toe board (152.0 mm or 6 inches) is recommended.

- If the scaffold toe board does not adequately protect against tools or objects on the scaffold from falling over the side, solid or mesh panels shall be installed as required by Clause 5.17 of CSA Standard Z797-09; Code of Practice for Access Scaffold.

- Guardrails made from lumber or wire rope must meet the requirements of Section 9 (3) and (4) respectively of the Nova Scotia Occupational Safety General Regulations.

## Fall Protection and Fall Arrest

A fall arrest system shall be used when any of the following activities occur 3.0 meters, or more, above the nearest safe work surface; assembly of a scaffold, dismantling a scaffold or when guardrails must be removed to perform a specific task. In the latter case the guardrails must be replaced as soon as the task is complete.

The fall arrest system must comply with the requirements of Part 21, Fall Arrest Systems, of the Nova Scotia Workplace Health and Safety Regulations.

## Access and Egress

Scaffold platform access shall be via one of the following modes; ladders, stairs, ramps or direct passage from another scaffold platform. All modes of access shall meet the requirements specified in Clauses 5.13 through 5.13.5 of CSA Standard Z797-09; Code of Practice for Access Scaffold.

Stairs should be used as the means of access to working platforms that are more than 11.0 m (36.0 ft) above grade.

Scaffolds structures shall not be climbed unless they are designed to be used for access and platform planking does not affect an employee’s ability to move safely from a frame to a platform.

When employee climb ladders to access a platform they shall maintain 3 point contact at all times and not carry tools, etc. by hand.

Vertical ladders must:

- be securely fastened at the top and bottom of the ladder and at intervals that meet the manufacturers requirements.
- have rungs spaced 305 mm plus or minus 7 mm (12 in. plus or minus ¼ in.) centers with the lowest rung not more than 0.60 m (2.0 ft) above the ladder access level.
- extend at least 0.9 m (3.0 ft) above the upper most platform that is accessed.
- have a clear space of at least 0.15 m (6.0 in.) behind each rung.
- be positioned such that their use will not overturn the scaffold.
- have rest platforms at intervals not more than 9.0 m (30.0 ft) apart.
- be offset at each rest platform.
- have ladder cages as required by provincial regulations or in the absence of regulation where the ladder height exceeds 3.0 m (10.0 ft). The ladder height is to be measured from grade, rest platform or work platform to the height of the next rest platform or work platform.

For further information regarding ladder cages see CSA Standard Z797-09; Code of Practice for Access Scaffold

## Scaffold Inspections

These requirements for scaffold inspection apply to all scaffolds regardless of their height.

To ensure regulatory compliance:

- Scaffold components must be inspected prior to and during scaffold erection.
- Scaffold shall be inspected prior to initial use and each work day before beginning work.
- Copies of completed inspections must be kept in a safe location at the work site.

Following a scaffold inspection the following actions must be taken:

- The scaffold shall be classified and as follows and the condition posted by using the appropriate tag:
    - **Green Tag** - Safe For Use
    - **Yellow Tag** - Having a potential or unusual hazard that requires caution (and action); or
    - **Red Tag** - Unsafe For use

The inspection results shall be communicated to all scaffold users and appropriate corrective action shall be taken to deal with all deficiencies that have been found.

In addition to daily inspections all scaffolding shall be inspected:

- before being used after any accident, incident or other occurrence that may have affected the integrity or stability of the scaffold such as; being struck by a crane or other vehicle, following a severe storm, a heavy weight falling on the scaffold or a work platform or the surface on which the scaffold is erected heaves or subsides.
- after any repairs are performed on the scaffold or its components.
- as the scaffold is disassembled to ensure faulty or damaged parts are removed from service and replaced immediately with approved parts.

## Clearance Distances Between Scaffolds and Power Lines

Any time a scaffold is moved or erected the following points must to considered:

- The distance from the scaffold to overhead power lines.
- Vertical distance between the ground and any sagging power lines.

Recommended clearances to be maintained between scaffolds and power lines are as follows:

| Phase to Phase Voltage of Energized Electrical Power Line or Power Line Equipment | Distance |
|---|---|
| 750 volts and up to 69,000 volts | 3.0 meters |
| Greater than 69,000 volts and up to 138,000 volts. | 5.0 meters |
| Greater than 138,000 volts | 6.0 meters |

**These distances must be maintained when scaffolds are being erected, used, moved, altered or dismantled.**