SCAFFOLD, LADDER & FALL PROTECTION PROGRAM

THE UNIVERSITY OF MICHIGAN
PLANT DIVISION

Prepared by The Department of Occupational Safety and Environmental Health
Ann Arbor, Michigan 48109
Scaffold, Ladder, & Fall Protection Program
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I. PURPOSE AND SCOPE

A. Purpose: To provide planning, procedures and training for worker’s safety while working on elevated working surfaces and ladders for Plant Operations’ employees, insuring compliance with governmental regulations.

B. Scope: All general industry and construction industry employees of Plant Operations and its separate departments.

II. DEFINITIONS

A. Aerial Lift - a mobile device used to elevate workers to job sites above the ground. It includes extension boom platforms, aerial ladders, articulating boom platforms, scissors lift platforms, vertical towers, or any combination of these.

B. Controlled Access Zone - an area where access is controlled, and certain work may take place (such as leading edge work or overhand bricklaying) without the use of guardrails, personal fall arrest systems or safety nets.

C. Erecting and Disassembling Scaffolding - the process of building or taking down a scaffold to or from its completed state.

D. Fabricated Frame Scaffold (tubular welded frame scaffold) - a supported scaffold consisting of a platform supported on fabricated end frames with integral posts, horizontal bearers, and intermediate members.

E. Fall Protection Plan - an optional method of providing fall protection on construction sites during leading edge work, or precast concrete erection, when other means of fall protection are infeasible or create a greater hazard.

F. Formwork and Reinforcing Steel - the framing and steel reinforcing built in preparation for the pouring and setting of concrete.

G. Guard Rail System - a barrier erected to prevent employees from falling to a lower level.

H. Ladder Safety Device - A fall arrest system designed for use while ascending or descending a fixed ladder.

I. Leading Edge - the edge of a floor, roof, formwork, decking, or other walking/working surface, which changes location as additional floor, roof, formwork, or decking is constructed.

J. Low Slope Roof - a roof with a slope less than or equal to 4 in 12 vertical to horizontal (18 degrees).

K. Mobile Scaffold - a powered or un-powered, portable, caster, or wheel mounted supported scaffold.
L. **Outrigger** - the structural member of a scaffold used to increase the base width and provide increased support and stability.

M. **Personal Fall Arrest System** - a system used to arrest an employees’ fall, consisting of an anchorage, connectors, body harness, and may include a lanyard, deceleration device, lifeline, or combination of these.

N. **Positioning Device** - a body belt or harness rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning back.

O. **Safety Monitoring System** - a system in which a properly trained person is responsible for recognizing and warning employees of fall hazards.

P. **Safety Net System** - a method of fall protection on construction sites where a net is erected around the work site where fall hazards exist. This net system must meet the specifications outlined in the OSHA fall protection standard.

Q. **Scaffold** - a temporary elevated platform and its supporting structure, used to support employees or materials or both.

R. **Supported Scaffold** - a platform supported by outrigger beams, brackets, poles, legs, uprights, posts, frames, or similar rigid support.

S. **Suspension Scaffold** - a platform suspended by ropes or other non-rigid means from an overhead structure.

T. **Walking/Working Surface** - any surface, horizontal or vertical, on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork, and concrete reinforcing steel, but not including ladders, vehicles, or trailers.

U. **Warning Line System** - a barrier erected to warn employees that they are approaching an unprotected side or edge.

V. **Unstable Object** - items whose strength, configuration, or lack of stability may allow them to become dislocated and shift, and may not properly support the loads imposed on them, and cannot be used as a safe base support for scaffolds (includes, but not limited to barrels, boxes, loose brick and concrete blocks).

### III. RESPONSIBILITIES

A. **Department**

1. **Management**
   
   a. Each supervisor shall effectively enforce compliance of this program’s procedures, including the use of disciplinary action, for any violations or deviations from the procedures outlined in this program.
b. Each supervisor shall assure that the equipment required for compliance with this program is in proper working order and made available for use by their employees.

c. Each supervisor shall promptly investigate, and report all on-the-job accidents or job related health problems.

2. Employees

a. Employees shall comply with the procedures of this program.

b. Employees shall consult with their supervisor, OSEH, or other knowledgeable personnel, when they have questions regarding their safety.

c. Employees shall report any accidents or job related injuries or illnesses to their supervisor and seek prompt medical treatment, if necessary.

B. Occupational Safety and Environmental Health (OSEH)

1. OSEH shall provide technical assistance on fall protection, scaffold safety, or ladder safety, when called upon.

2. OSEH shall provide training, and training guidance and assistance, as required.

3. OSEH shall inspect fall protection, scaffolds, ladders, and the use of each pursuant to this program, to insure the safety of University employees’.

IV. PROCEDURE

A. General

1. Employees must be protected from falling hazards on all elevated walking/working surfaces. The preferred method of fall protection in all situations is a guard rail system.

2. All walking/working surfaces must be strong enough to hold the employees working on that surface, their equipment and materials.

3. Scaffolds must have fall protection, preferably a guard rail system, when ever the scaffold is built higher than one flight or section. When a guard rail system is not used, either safety nets or personal fall arrest systems must be used and conform to the same standards required when used in non-scaffold situations.

4. Employees using an articulating boom or vehicle mounted aerial lifts will use a personal fall arrest system in addition to the guard rail system designed into the lift.

5. Safety belts are only allowed to be used with positioning devices, and must have attachment rings on both sides of the belt. All other personal
fall arrest systems will be used with a full body harness. All detachable hooks used on lanyards and tie-offs will be the locking type.

6. Ladders and stairs are not considered walking/working surfaces, but have separate manufacturing and construction specifications for safety, as well as fall hazard safety precautions.

B. Fall Protection

1. Permanent Structures.

For any permanently built structure, a guard rail system will be installed in areas where there are fall hazards of 4 feet or more and employees are present in the area on a regular basis. A checklist for fall protection in specific situations is attached in Appendix A of this program.

2. Temporary or Transient Work Situations

a. Workers must be protected from fall hazards when guard rail systems have been temporarily removed, or when workers are conducting repair, renovation, alteration, or custodial work, and there is a fall hazard of 6 feet or more.

b. The three primary methods to protect workers from falls are:

i. Guard rails.
ii. Safety nets.
iii. Personal fall arrest devices.

c. Other methods of fall protection can be used in specific situations:

i. Positioning devices may be used when doing concrete formwork and reinforcing steel work.
ii. Fences or barricades can be used around excavations, wells, pits or shafts.
iii. Covers can be used over holes, wells, pits or shafts.
iv. Warning lines with a controlled access zone, safety monitor system, or fall protection plan can be used during leading edge work, on low slope roofs, or when overhand brick laying is being done.

Appendix B contains a table summarizing methods of acceptable fall protection for different situations.

c. When the fall protection methods listed in paragraphs a and b above are not feasible, or will create a greater hazard, then the lead worker on the job will consult with OSEH Rep. for Plant to determine a solution.

C. Protection from falling objects.

When there is a falling object hazard from any elevated walking/working surface (to include scaffolds), employees will wear head protection and one of the following techniques will be used to reduce the falling object hazard:
a. Toeboards at least 3.5 inches high will be installed on all elevated walking/working surfaces;

b. A canopy of sufficient strength to catch all falling objects will be erected below all elevated walking/working surfaces; or

c. A barricade will be built to keep employees out of the falling object hazard area.

D. Scaffolds

1. General

a. All scaffolds erected or dismantled by Plant will be supported scaffolds. Suspended scaffolds will not be used unless specific prior coordination has been done with OSEH.

b. The standard supported scaffolds used by Plant will be the fabricated frame type or tube and coupler type. Plant will not use a different type of scaffold without specific prior coordination with OSEH.

2. Construction of Scaffolds

a. In general, all supported scaffolds must be capable of supporting 4 times their rated load. All job built or non-prefabricated scaffolds will be designed by a licensed professional engineer, and be built in accordance with the design.

b. Planking will consist of specifically designed hook on platforms or scaffold grade lumber. Lumber planking will extend over the end support at least 6 inches, but not less than 12 inches. Don’t coat or cover the surfaces of planking so as to obscure the surface from inspection.

c. All working levels of scaffolds will be fully planked, unless the work being done or safety considerations preclude it. Any time a scaffold’s working level cannot be fully planked, personal fall arrest systems must be worn.

d. Scaffold components made by different manufacturers will not be mixed together on a single scaffold, unless specifically designed to be interchangeable. Do not physically modify any scaffold components.

e. All scaffold platforms and walkways will be at least 18 inches wide and have guard rails on all sides, unless the work being done or safety considerations preclude it. Personal fall arrest systems must be used when guard rails are not present.

f. Scaffolds higher than 4 base widths must be kept from tipping by using guy wires, or attaching to a permanent structure. If outriggers are used, they count as part of the scaffold base.
Vertically, guy wires or attachments will be placed at the 4 width height, and every 20 feet above, to at least 4 widths distance from the top of the scaffold. Horizontally, guy wires or attachments will be placed every 30 feet or less.

g. The base of a scaffold will be on a level, rigid surface capable of supporting the weight of the scaffold and its work load, without settling or moving. Unstable objects will not be used as, or to support, a scaffold base or work platform. All legs will be placed on and secured to mud sills or other weight distribution materials.

h. Mobile scaffolds will be locked or otherwise secured from moving while occupied. Do not move a mobile scaffold while occupied. Overhead clearance from power lines or other possible safety hazards must be checked before moving a mobile scaffold. Fork lifts, front loaders, or other heavy equipment will not be used as, or to support, a scaffold unless specifically designed for it.

3. Erecting, Moving and Dismantling Scaffolds

a. All scaffold erecting and dismantling activities will be done under the direct supervision of a lead person that has completed the training outlined in this program and has the responsibility and knowledge to take prompt corrective action to eliminate hazards.

b. All workers erecting, moving or dismantling a scaffold will be experienced and trained in these activities, and protected from falling hazards. This protection will be the best feasible or practical as determined by the lead person in charge of the procedure.

c. Standard scaffold access methods will be added to the scaffold as soon as safely possible during the erection process. Diagonal cross bracing will not be used to support workers or as access to the scaffold.

d. The existing platform where the erectors/dismantlers are working from, will be left in place and fully planked until the next level of vertical posts are placed, braced and fully platformed.

e. Vertical cross bracing will be installed in both directions on both sides of the scaffold, so as to form an “X”. Cross bracing will be installed as often as possible and in sufficient amount to insure the structural integrity of the scaffold. Mobile scaffolds will use horizontal diagonal bracing as needed to insure structural integrity.

f. If portable ladders are used to access working levels of a scaffold, they will be secured from moving by tying at the top and bottom of the ladder.

g. Ladders, hand holds or railings will extend at least 36 inches above the landing where the worker gets off of the ladder or stairs.
h. Integrated prefabricated scaffold access frames (i.e., the vertical scaffold ends designed to be used as a ladder to climb the scaffold) can act as the access to the working levels of a scaffold as long as the ladder rungs are lined up on the same vertical line, and rest platforms are supplied every 35 feet.

4. Use of Scaffolds.
   a. All scaffolds will be inspected by the lead worker before each work shift, and after any incident that could effect the structural integrity of the scaffold. Any scaffold that has been weakened or damaged will be repaired or replaced before any workers are allowed to use it.
   b. Do not load scaffolds with loads beyond their capacity to hold safely.
   c. Always keep scaffolds a safe working distance from power lines (at least 10 feet. Safe working distances do not apply to situations where a scaffold is being used for work being performed on electrical lines, but this work will be done by certified electricians only.
   d. Keep scaffolds clean of debris, excessive amounts of materials or tools, ice, snow, or other slippery materials.
   e. Do not allow workers on scaffolds during bad weather or high winds. Do not use lean-to scaffolds.
   f. Do not use ladders, or other similar devices, on scaffolds to increase the working level height of employees.
   g. Vertical cross bracing will not be used as a ladder, or to access the working levels of the scaffold.
   h. Use control or tag lines to control swinging loads of materials or equipment being lifted to a scaffold with an overhead cable or rope.
   i. Scaffolds must be fully grounded when electric welding is being done on the scaffold. This grounding must also include possible current pathways through structures the scaffolds is attached to, and any current pathways created through cables or other material/equipment hoisting operations.

5. Fall Protection on Scaffolds.
   a. Unless specifically exempted by this program, all workers must be protected from falling hazards anytime they work on a scaffold higher than one flight/level. Standard fall protection on any scaffold will consist of a guardrail system with a top rail capable of supporting and protecting a weight of at least 200 lb., a midrail, and toeboards.
b. If using a guard rail system is not practical, or would create an increased safety hazard, a personal fall arrest system (body harness and lanyard) may be used to protect employees from falling hazards. The use of personal fall arrest systems will be restricted to the specific areas of the scaffold where guard rails cannot be used, and guard rails will be used in all other areas.

c. Body harnesses will be attached to the scaffold structure, or vertical or horizontal lifeline. Vertical lifelines will be secured to a fixed safe point of anchorage independent of the scaffold (e.g., a building or other structure) and protected from sharp edges and abrasion. Horizontal lifelines will be secured to two separate points of the scaffold.

d. Guard rail systems will be installed on all open sides of the scaffold. Vertical cross bracing may be used as a top rail only when the center crossing point of the two braces is 38-48 inches above the working surface.

E. Ladders and Stairs

1. Fixed Ladders

a. All fixed ladders will be constructed and maintained as prescribed in the ANSI Standard A14.4, and the MIOSHA Ladder Standards.

b. All fixed ladders longer than 20 feet will be constructed with the required cages, wells, ladder safety devices, or self retracting life lines. Ladders longer than 20 feet, that are not equipped with a ladder safety device or self retracting lifeline, will have a landing at least every 30 feet.

c. Fixed ladders will be inspected periodically, and before use, for corrosion, wear, and broken parts. If a defect is found on a fixed ladder, it will be tagged “do not use”, marked so the defect is easily identified, or blocked from use and access until repaired to a serviceable condition.

2. Portable Ladders

a. All portable ladders will conform to the applicable ANSI standard, and this will be marked on each ladder.

b. All portable ladders will be inspected daily, when used. The daily inspection will include, but not be limited to: rungs or steps, side rails, guides or spreaders, and locking devices. If any part of the ladder is damaged or unserviceable, then it will be tagged “Dangerous - Do Not Use”, and repaired or destroyed.

c. Ladders will not be painted or otherwise defaced so that defects in the ladder would be covered.
3. Permanent Stairs.

All stairs built as a permanent part of a structure will be constructed and maintained as prescribed by the governing local building codes, and the MIOSHA General Industry Standard, to include railings and hand rails.

4. Temporary Stairs.

All stairs built as temporary structures on a construction site will be constructed and maintained as prescribed in the MIOSHA Construction Standard, to include tread depth, riser height, stairway angle, doors, gates or landings, hand rails and guard rails, and will be dismantled when construction work is completed.

F. Aerial Lifts.

1. All employees required to operate an aerial lift must be medically screened, trained and licensed to operate the aerial lift to be used, in accordance with the University Aerial Lift Program.

2. Aerial lift training will be conducted by a trainer recognized by OSEH as being qualified to conduct aerial lift training.

3. Once training has been completed, a perspective aerial lift operator must pass a test confirming their knowledge. Once the test has been passed and proof sent to OSEH, OSEH will issue the employee a license to operate aerial lifts.

4. Once every three years, all licensed aerial lift operators must be retraining and tested, as outlined in the University Aerial Lift Program.

G. Training.

1. All employees whose duties require them to work at heights must have the appropriate training. Refer to Appendix C of the Plant Safety Training Program for what job categories should receive training in which subjects.

2. Scaffold Training will be conducted by OSEH through the Plant Safety Training Program.

   a. Scaffold users and erector/dismantlers will be trained on fall protection, as listed in paragraph b. below, and the following areas (see Appendix C):

      i. The proper use of the scaffold types used and the maximum intended load capacity of these scaffolds.

      ii. The electrical, fall, and falling object hazards of erecting, working on, and dismantling scaffolds, and the procedures and equipment used to control these hazards.

      iii. The procedures for erecting, dismantling, moving, operating, inspecting, maintaining and repairing the scaffold.

      iv. The relevant parts of the scaffold standard.
b. Fall Protection Training will be done by OSEH through the Plant Safety Training Program and cover the following topics (see Appendix D).

i. The nature of the fall hazards in the work area.
ii. The correct procedures for erecting, using, maintaining, disassembling and inspecting fall protection systems.
iii. The use and operation of guard rail systems, safety net systems, personal fall arrest systems, warning line systems, controlled access zones, safety monitoring systems, and any other fall protection used.
iv. The limitations for using mechanical equipment on roofs.
v. The erection of overhead protection and protection from falling objects.
vi. The employee’s role in safety monitoring systems and fall protection plans, and the contents of the fall protection standard.

3. Ladder Training

a. Each employee required to use a ladder will receive training as part of the Plant Safety Orientation Training Program, or will receive on the job training from their supervisor on how to recognize hazards related to ladder use, and procedures to minimize those hazards.

b. Training will include the following topics: fall hazards; the correct procedures for inspecting, erecting, using, and maintaining the ladders to be used; the correct procedures for using and maintaining any fall protection required; the maximum load carrying capacities of the ladders to be used; and relevant details of the ladder standard (see Appendix E).

4. Recordkeeping

a. Training and recordkeeping will be done in accordance with the Plant Safety Training Program.

b. Employees will be retrained when there are changes in the work site effecting work procedures or equipment covered by this program, or when they cannot demonstrate adequate knowledge in the relevant topics of this program.
APPENDIX A
Safety Checklist for Fall Protection for Permanent Structures

Stairs:
• railings and handrails
• treads and risers in good condition
• non-slip surfaces on stairs
• meet local building code, OSHA and ANSI specifications

Portable Ladders:
• gripping safety feet
• wooden ladders coated with a clear, protective material
• all parts and fittings tight and secure
• non-slip surfaces on rungs
• set on secure, firm, level, non-skid surfaces, with top of ladder against a solid, stationary object
• meet OSHA and ANSI specifications

Fixed Ladders:
• adequate room for putting feet on the rungs
• a smooth surface for hands to grip
• angled between 75-90 degrees from horizontal
• all parts and fittings tight and secure
• a cage, vertical life line, or ladder safety device if higher than 20 feet
• a landing every thirty feet, unless equipped with a ladder safety device
• a landing at the top of the ladder with a cage or hand holds at least 42 inches above the landing
• the top of the ladder guarded or marked to prevent accidental access
• meet OSHA and ANSI specifications

Loading Docks:
• if available, dock blocks up and in place, or doors closed when dock isn’t in use
• specific training for workers required to use motorized equipment on docks. (Powered industrial truck drivers must be licensed through the University Powered Industrial Truck Program administered by OSEH.)

Platforms (to include scaffolds, aerial lifts):
• guardrails and toeboards in place and securely attached
• fall arrest system (body harness and lanyard) for workers required to lean over the edge of the platform
• guard rails and fall arrest system on vehicle mounted or articulating boom aerial lifts
• meet OSHA specifications

Floor and Wall Openings:
• all openings safely covered, blocked or guarded (guard rails)
• when guard rails are removed, continuously watched to warn workers, and personal fall arrest system for workers required to lean out the unguarded side
APPENDIX B
## Quick Guide to Fall Protection Methods

<table>
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<th>Safety Net Systems</th>
<th>Fall Arrest Systems</th>
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<th>Covers</th>
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<th>Toeboards or Screens</th>
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<th>Warning Line Plus Other System</th>
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<th>Notes</th>
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### NOTES:

1. When it is unfeasible or creates a greater hazard to use one of the indicated systems, contact OSEH.
2. If a guardrail system is chosen to provide fall protection and a controlled access zone has already been established for leading edge work, a warning line may be used in lieu of a guardrail that parallels the leading edge.
3. If guardrail systems, or portions thereof, are removed to facilitate hoisting operations, and the worker must lean through the access opening or out over the edge of the access opening, the worker should use personal fall arrest system.
4. All holes (including skylights) should be protected by covers to prevent workers from tripping or falling into the hole or prevent objects from falling through the hole.
5. When the worker reaches more than 10 inches below the walking/working surface, the use of a controlled access zone is not allowed to protect from fall hazards.
6. A warning line system should be used with a safety monitoring system. On roofs 50 feet wide or less, the use of a safety monitoring system alone is allowed.
7. Both guard rails and personal fall arrest systems are required.
APPENDIX C
Scaffold Safety Training

OBJECTIVE:

To explain the proper safety procedures to be followed when erecting, moving, using, and dismantling scaffolds.

SUGGESTED MATERIALS TO HAVE ON HAND:

* Scaffold Safety Videos
* Example of a properly built scaffold
* Examples of personal fall arrest systems

INTRODUCTION:

Scaffolds, by definition are temporary, and are typically built and modified at the work site. Because of their temporary nature and the fact that workers use them to work at elevated heights, special training must be given to all workers that use scaffolds, with additional training given to workers responsible for erecting, moving and dismantling scaffolds. The training included here will cover the safety procedures for erecting, moving, dismantling, and using scaffolds.

Scaffolds can be of two main types: supported or suspended. The only type presently used by the Plant Division is the fabricated frame type of supported scaffold. This training will focus on the procedures to be followed when using this type of scaffold. If at anytime Plant will be using a different type of scaffold, supported or suspended, this should be coordinated with OSEH to insure adequate training and procedures are being followed to maintain compliance with the regulation.

HAZARDS:

The most obvious hazard associated with scaffolds are falls. But rather than simply state that there is a fall hazard, we should look at the root causes of the accidents on scaffolds. According to OSHA inspection records, many accidents can be attributed to specific deficiencies or failures of the scaffold. Most accidents on scaffolds happen because of failure or slipping of the planking used as the work platform. Workers slipping on debris or other material on the scaffold work platform, as well as workers being struck by falling objects, accounted for the majority of other scaffold accidents. Only about one third of scaffolds inspected were equipped with guard rails. If a scaffold is correctly built, has adequate fall protection, and is kept clean, most accident can be avoided.

SCAFFOLD CONSTRUCTION/MANUFACTURE:

In general, all scaffolds must be capable of supporting 4 times their rated load. All job built, non-prefabricated scaffolds will be designed by a licensed professional engineer, and be built in accordance with the design.
All working levels of scaffolds will be fully planked, unless the work being done or safety considerations preclude it. Any time a scaffold’s working level cannot be fully planked, additional fall protection techniques will be used (i.e., personal fall arrest systems).

Planking will consist of specifically designed hook on platforms or scaffold grade lumber. Lumber planking will extend over the end support at least 6 inches, but not less than 12 inches. Don’t coat or cover the surfaces of planking so as to obscure the surface from inspection.

Scaffold components made by different manufacturers will not be mixed together on a single scaffold, unless specifically designed to be interchangeable. Do not physically modify any scaffold components.

All scaffold platforms and walkways will be at least 18 inches wide and have guard rails on all sides, unless the work being done or safety considerations preclude it. Then personal fall arrest systems must be used.

The highest working level of a free standing scaffold will not be higher than a distance equal to four times its narrowest base dimension (i.e., height is equal to or less than 4 times the width). If outriggers are used, they count as part of the scaffold base. Scaffolds higher than 4 widths must be kept from tipping by using guy wires, or attaching to a permanent structure. Vertically, guy wires or attachments will be placed at the 4 width height, and every 20 feet above, to at least 4 widths distance from the top of the scaffold. Horizontally, guy wires or attachments will be placed every 30 feet or less. Scaffolds higher than 125 feet will be designed by a licensed professional engineer.

The base of a scaffold will be on a level, rigid surface capable of supporting the weight of the scaffold and its work load, without settling or moving. Unstable objects will not be used as or to support a scaffold base or work platform.

Diagonal cross bracing will be installed in both directions on both sides of the scaffold, so as to form an “X”. Cross bracing will be installed as often as possible and in sufficient amount to insure the structural integrity of the scaffold.

Mobile scaffolds will be locked or otherwise secured from moving while occupied. Do not move a mobile scaffold while occupied. Overhead clearance from power lines or other possible safety hazards must be checked before moving a mobile scaffold. Fork lifts, front loaders, or other heavy equipment will not be use as or to support a scaffold unless specifically designed for it.

**SCAFFOLD ERECTING, MOVING AND DISMANTLING:**

All workers erecting, moving or dismantling a scaffold will be experienced in these activities, and protected from falling hazards. This protection will be the best feasible or practical as determined by the trained person in charge of the procedure. Overhead clearance from power lines or other possible overhead hazards must be checked before erecting or moving a scaffold.
Standard scaffold access methods will be added to the scaffold as soon as safely possible during the erection process. Diagonal cross bracing will not be used to support workers or as access to the scaffold.

The existing platform where the erectors/dismantlers are working from, will be left in place until the next level of vertical posts are placed, braced, and have been platformed.

**SCAFFOLD ACCESS:**

Rest platforms for ladders will be placed at least every 35 feet. Rest platforms for stairs will be placed at least every 12 feet (measured on the vertical). Rest platforms will be at least 18 inches square.

If portable ladders are used to access working levels of a scaffold, they will be secured from moving by tying at the top and bottom of the ladder. Ladders, hand holds or railings will extend at least 36 inches above the landing where the worker gets off of the ladder or stairs.

Integrated prefabricated scaffold access frames (i.e., the vertical scaffold ends designed to be used as a ladder to climb the scaffold) can act as the access to the working levels of a scaffold as long as the ladder rungs are lined up on the same vertical line, and rest platforms are supplied every 35 feet. Do not use diagonal cross bracing as a ladder, or to access the working levels of the scaffold.

**SCAFFOLD USE:**

All scaffolds will be inspected before each work shift, and after any incident that could effect the structural integrity of the scaffold. Do not load scaffolds with loads beyond their capacity to hold safely. Any scaffold that has been weakened or damaged will be repaired or replaced before any workers are allowed to use it.

Always keep scaffolds a safe working distance from power lines (at least 10 feet, plus 4 inches for every kilovolt above 50 kilovolts). For example, the safe working distance from a 53 kilovolt electrical line would be 11 feet. Safe working distances do not apply to situations where a scaffold is being used for work being performed on electrical lines, but this work will be done only by certified electricians.

Keep scaffolds clean of debris, excessive amounts of materials or tools, ice, snow, or other slippery materials. Do not allow workers on scaffolds during bad weather or high winds. Do not use lean-to scaffolds. Do not use ladders, or other similar devices, on scaffolds to increase the working level height of employees. Use control or tag lines to control swinging loads of materials or equipment being lifted to a scaffold with an overhead cable or rope.

Scaffolds must be fully grounded when electric welding is being done on the scaffold. This grounding must also include possible current pathways through structures the scaffolds is attached to, and any current pathways created through cables or other material/equipment hoisting operations.
FALL PROTECTION:

Unless specifically exempted, all workers must be protected from falling hazards anytime they work on a scaffold higher than one flight/level. Standard fall protection on any scaffold will consist of a guardrail system.

If using a guard rail system is not practical, or would create an increased safety hazard, a personal fall arrest system may be used to protect employees from falling hazards. The use of personal fall arrest systems will be restricted to the specific areas of the scaffold where guard rails cannot be used, and guard rails will be used in all other areas. Guard rails may be left off of the working side of a scaffold and workers will not required to use personal fall arrest systems, as long as the scaffold is less than 14 inches from the face of the work.

Personal fall arrest systems will be attached by lanyard to the scaffold structure, or vertical or horizontal lifeline. Vertical lifelines will be secured to a fixed safe point of anchorage independent of the scaffold (e.g., a building or other structure) and protected from sharp edges and abrasion. Horizontal lifelines will be secured to two separate points of the scaffold.

Guard rail systems will be installed on all open sides of the scaffold. Diagonal cross bracing may be used as a top rail only when the center crossing point of the two braces is 38-48 inches above the working surface.

PROTECTION FROM FALLING OBJECTS:

When there is a falling object hazard, employees will wear head protection, and toeboards, a canopy, or a barricade will be will also be used.

WRAP-UP:

Scaffolds are useful and common on construction sites, but because they are not always adequately built or used safely. Improperly built or used scaffolds are a sure recipe for an accident. If you follow the procedures of this program, the risks of an accident will be significantly reduced. Always use safety procedures, keep your eyes open, and don’t take chances.

SUGGESTED DISCUSSION QUESTIONS:

1. What are the two basic types of scaffolds?
2. How much weight must a scaffold be capable of holding?
3. How high can a scaffold be built before additional lateral support must be added?
4. How far must the scaffold be kept from live electrical wires?
5. How often should a scaffold be inspected?
6. What is the standard method of fall protection used on a scaffold?
7. If guard rails can’t be installed, what type of fall protection must be provided?
Scaffold Safety Do’s and Don’ts

DO:

* Insure the scaffold has adequate weight capacity for the job.
* Inspect scaffolds before use.
* Make sure work platforms are in good condition and clean.
* Use guard rails and fall protection.
* Fully plank work platforms.
* Secure planking so it doesn’t slip.
* Place scaffolds closer than 14 inches to the work.
* Place scaffolds on firm, level surfaces.
* Provide adequate access to the working levels.
* Anchor the scaffold when built higher than 4 widths.
* Replace broken parts immediately.
* Use tag lines to control suspended loads.
* Protect workers and passers by from falling objects.
* Carry tools to the working level in your pocket on your belt, or raise them by rope.

DON’T:

* Overload the scaffold.
* Use scaffolds near electrical hazards.
* Use a broken parts or planking.
* Mix incompatible brands of scaffolds.
* Build the scaffold too high without adequate lateral support.
* Use unstable objects to support the scaffold base.
* Climb on cross bracing.
* Move a scaffold while occupied.
* Use scaffolds during storms or high winds.
APPENDIX D
Fall Protection

OBJECTIVE

To explain fall protection requirements and options for both the general industry and construction industry.

INTRODUCTION

Falling hazards account for numerous injuries and fatalities in the work place. The standard general industry fall protection device is the guardrail. In the construction industry, use of fall protection is often complicated by being in a work place that is in the process of being built and not entirely self supporting. While using guardrails is not always practical, the need for fall protection is usually greater because of the inadequacies of the structure. Coming up with adequate fall protection solutions on a construction site often takes ingenuity and prior planning.

HAZARDS

There are numerous areas where workers can encounter falling hazards. Some of these areas will only be encountered in a construction environment, but construction work is often conducted within an area considered general industry (e.g., running new electrical lines and conduit through an office area). Also, protecting workers on lower levels from falling objects (i.e., dropping) is typically included under the topic of fall protection. No matter what the work place situation, protecting workers from falling and dropping hazards should always be a safety consideration. Listed below are some of the typical areas with falling hazards:

* floor holes and openings
* wall holes and openings
* platforms
* runways and ramps
* stairways
* open sided walking/working surfaces
* skylights
* roofs
* leading edge construction work
* elevated work platforms (scaffolds and aerial lifts)

It should be noted that some of these areas have separate OSHA and MIOSHA standards with their own fall protection requirements (e.g., scaffolds, aerial lifts, steel and pre-cast concrete erection). If your work area comes under one of these separate standards, then your fall protection should comply with the applicable standard.

FALL PROTECTION FOR THE GENERAL INDUSTRY

For the general industry, there are some general guidelines for requiring fall protection. Basically, anyplace that someone could fall 4 feet or more from one level to another should have fall protection. Guard rails are the most common type of fall protection used. Also, stairways with 4 or more steps should have a railing, and steps are required for a horizontal elevation
Fall Protection (continued)

change of 16 inches or more. Listed below are some additional guidelines for specific types of work areas.

Stairs:
* have covers or guardrails
* have railings and handrails
* have treads and risers in good condition
* have non-slip surfaces on stairs

Portable Ladders:
* have gripping safety feet
* have all parts and fittings tight and secure
* have non-slip surfaces on rungs
* be set on secure, firm, level, non-skid surfaces; top of ladder against a solid, stationary object

Fixed Ladders:
* have adequate room for putting your feet on the rungs
* have a smooth surface for your hands to grip
* be angled between 75-90 degrees from horizontal
* have all parts and fittings tight and secure
* have a cage or fall arrest system if higher than 20 feet
* have a landing every thirty feet, unless equipped with a fall arrest system
* have a landing at the top of the ladder with a cage or hand holds at least 42 inches above that landing
* have the top of the ladder guarded or marked to prevent accidental access

Loading Docks:
* if available, dock blocks up and in place, or doors closed when dock isn’t in use
* specific training for workers required to use motorized equipment on docks

Platforms:
* guardrails and toeboards in place and securely attached
* additional fall protection available for workers required to reach or lean over the edge of the platform with the guardrails removed

Floors and Wall Openings:
* all openings are safely covered, blocked or guarded or under constant attendance to watch for and warn other workers

FALL PROTECTION FOR THE CONSTRUCTION INDUSTRY

For the construction industry, the general guideline for requiring fall protection is anyplace that someone could fall 6 feet or more from one level to another should have fall protection. Also, steps are required for a horizontal elevation change of 19 inches or more. While guardrails are the preferred type of fall protection, they are not always practical, so other options are available for the construction industry. These include fall arrest systems, safety net systems, controlled access zones, and many others. A table showing the twelve types of fall protection available to the construction industry and the types of situations where these different types of fall protection would be acceptable is attached for your reference. The Plant Division will be implementing a complete Fall Protection Program in the near future that will address these various options and
train the required workers on their uses. If you have any immediate questions regarding fall protection in the construction industry, please call OSEH at 764-3141.

SUGGESTED DISCUSSION QUESTIONS

1. What are some work areas or situations where fall protection should be used?
2. For the general industry, at what height must fall protection be used?
3. For the construction industry, at what height must fall protection be used?
4. What is the typical fall protection used in the general industry and the preferred type for use in any situation?

WRAP-UP

Work place falls can be the most grave type of hazard a worker can be exposed to. A fall from a relatively low height can cause a very significant injury or death. While most of us trust our own abilities to not fall in most situations, without adequate fall protection, once you’ve started falling, your only option is to land, and gravity can be very unforgiving. Take the time to use the correct fall protection for your job, and avoid the fall in the first place.
Fall Protection Checklist - General Industry

Stairs:
* have covers or guardrails
* have railings and handrails
* have treads and risers in good condition
* have non-slip surfaces on stairs
* meet OSHA and ANSI specifications

Portable Ladders:
* have gripping safety feet
* wooden ladders should be coated with a clear, protective material
* have all parts and fittings tight and secure
* have non-slip surfaces on rungs
* be set on secure, firm, level, non-skid surfaces; top of ladder against a solid, stationary object
* meet OSHA and ANSI specifications

Fixed Ladders:
* have adequate room for putting your feet on the rungs
* have a smooth surface for your hands to grip
* be angled between 75-90 degrees from horizontal
* have all parts and fittings tight and secure
* have a cage or fall arrest system if higher than 20 feet
* have a landing every thirty feet, unless equipped with a fall arrest system
* have a landing at the top of the ladder with a cage or hand holds at least 42 inches above that landing
* have the top of the ladder guarded or marked to prevent accidental access
* meet OSHA and ANSI specifications

Loading Docks:
* if available, dock blocks up and in place, or doors closed when dock isn’t in use
* specific training for workers required to use motorized equipment on docks

Platforms:
* guardrails and toeboards in place and securely attached
* additional fall protection available for workers required to reach or lean over the edge of the platform with the guardrails removed
* meet OSHA specifications

Floors and Wall Openings:
* all openings are safely covered, blocked or guarded or under constant attendance to watch for and warn other workers
The table below is meant to be a quick reference guide for workers and supervisors already familiar with the definitions and terms associated with the Fall Protection Standard. Because of the recent revision to this standard, a Fall Protection Program will be published in the near future. For more in depth information or clarification, contact OSEH.

### Types of Acceptable Fall Protection

<table>
<thead>
<tr>
<th>Types of Fall Hazards</th>
<th>Guardrail Systems</th>
<th>Safety Net Systems</th>
<th>Fall Arrest Systems</th>
<th>Positioning Device Systems</th>
<th>Covers</th>
<th>Controlled Access Zone</th>
<th>Warning Line System</th>
<th>Toeboards or Screens</th>
<th>Canopy Structures</th>
<th>Warning Line Plus other Syst</th>
<th>Hand Hats</th>
<th>Notes</th>
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**NOTES:**
1. When the employer can demonstrate it is unfeasible or creates a greater hazard to use these systems, the employer will develop and implement a fall protection plan.
2. If a guardrail system is chosen to provide fall protection and a controlled access zone has already been established for leading edge work, a warning line may be used in lieu of a guardrail that parallels the leading edge.
3. If guardrail systems, or portions thereof, are removed to facilitate hoisting operations, and the worker must lean through the access opening or out over the edge of the access opening, the worker should use personal fall arrest system.
4. All holes (including skylights) should be protected by covers to prevent workers from tripping or falling into the hole or prevent objects from falling through the hole and striking a worker.
5. When the worker reaches more than 10 inches below the walking/working surface, the use of a controlled access zone is not allowed to protect from fall hazards.
6. Bricklaying operations performed on scaffolds are regulated by the Scaffolds Standard.
7. A warning line system should be used with one of the following: guardrail system, safety net system, personal fall arrest system, or safety monitoring system.
8. On roofs 50 feet or less in width, the use of a safety monitoring system alone is allowed.
APPENDIX E
Ladder Safety

OBJECTIVE

To explain the proper selection, use and maintenance of portable ladders.

SUGGESTED MATERIALS TO HAVE ON HAND

* Different types of ladders (wood, metal, fiberglass, extension, step)
* Broken ladders or ladders in need of repair or disposal

INTRODUCTION

Ladders, while very common and uncomplicated equipment, account for a large number of accidents. While some of these accidents are from the failure of the ladder (i.e., a broken or poorly maintained ladder), most accidents result from the ladder being used improperly. If everyone used common sense while using a ladder, most accidents would be avoided.

HAZARDS

The most common hazard associated with ladders is falls, and this usually happens when the ladder is used improperly. However, a broken or un-maintained ladder can fail during use and also cause a fall. Selecting the wrong ladder for a job can also cause an accident. A ladder needs to tall enough for the job, but not too tall. When working on or near electrical equipment or power lines, the ladder must be made of a non-conductive material and care must be used while moving a ladder in these situations.

SAFEGUARDS FOR WORKING WITH LADDERS

There are regulations for ladder use issued by OSHA (29 CFR Parts 1910.25, 1910.26 and 1926.1050-1926.1060) and under MIOSHA (Part 4 for the General Industry and Part 11 for the Construction Industry). There are also extensive manufacturing standards for ladders published by the American National Standards Institute ( ANSI A14.1-5). These regulations and standards mainly cover the specifications required when building and manufacturing ladders, but their are some small sections on ladder use.

Ladders should be periodically inspected for defects and damage. A ladder inspection should cover the following items:

* Steps and rungs: Firmly intact, free of oil, grease and dirt, and have a slip resistant surface.
* Support braces, bolts and screws: In place and tight.
* Moving metal parts: lubricated.
* Rope: not warn or frayed.
* Spreaders & locking devices: Working properly and not bent, broken or fatigued.
* Safety feet: In place and clean.
* Metal ladders: Not dented or bent.
* Misc.: No splinters, sharp edges or broken parts.
Ladder Safety (continued)

If a ladder is found to be deficient in any of these areas, it should be fixed immediately, disposed of, or tagged “Do Not Use” and not used until fully repaired. If a ladder is to be repaired, it must be repaired in compliance with the required regulation and standard. As with many things today, the cost and hassles of repairing a piece of equipment often make it easier to replace rather than repair.

Ladders should be stored in an area that will not cause it to rot, corrode or otherwise deteriorate. It’s best to store a ladder in the upright position, to prevent sagging or warping. Ladders stored on their sides, should be supported along their entire length.

Ladders are rated based on the amount of weight they can support. Always insure the ladder you are using can support the weight it’s intended to hold. OSHA sets the following rating guidelines:

- Class I-A: 300 lb.
- Class I: 250 lb.
- Class II: 225 lb.
- Class III: 200 lb.

There are also other limitations placed on ladder length:

- Step ladders can be no more than 20 feet long.
- One-section ladders can be no more than 30 feet long.
- Extension ladders can be no more than 60 feet long overall, and the sections must overlap.

In order to ensure the safety of ladder users, the following guidelines should be followed:

- Place the ladder on a level surface. Use wide boards under the feet if the ground is soft.
- Feet should be parallel to the surface the ladder will rest against.
- Extend the ladder at least three feet above the edge of a top support or work area.
- Anchor the top and bottom of the ladder.
- Don’t rest the ladder against a window or window sash and don’t place a ladder in front of a door unless it’s locked or blocked.
- The base of the ladder should be one-fourth the distance to the top support away from the wall. (Example: a fifteen foot ladder is placed against a twelve foot wall. The base of the ladder should be three feet away from the wall.)
- Position an extension ladder before you extend it.
- Only one person on the ladder at a time.
- Wear shoes with slip resistant soles.
- Always face the ladder and hold the sides with both hands.
- Carry tools in pockets or on a belt, but never in your hands. Use a rope to lift/lower tools to large to be carried in pockets or on belts.
- Always keep at least one hand on the ladder. Ladders are not meant to be working surfaces. If you need both hands to work, then you need a stable platform to work on instead of a ladder (e.g., a scaffold or aerial platform).
- Don’t step on the top two steps of a step ladder or the top four rungs of a non-step ladder.
Ladder Safety (continued)

* Stay centered over the ladder. Keep your belt buckle between the side rails.
* Never move an occupied ladder.
* Always move slowly and cautiously.
* Try and use two people to carry a ladder. If only one person is used to carry the ladder, keep the front end up and back end near the ground.

And don’t use items as ladders that are not meant to be ladders. Chairs, tables, boxes, etc., are not ladders and will easily cause accidents. If you need a ladder, get a ladder.

SUGGESTED DISCUSSION QUESTIONS

1. What things should you look for when you inspect a ladder?
2. How are ladders rated?
3. When should you not use a metal ladder?
4. What are some of the key points of placing a ladder properly?
5. How far, measuring horizontally, should the base of the ladder be placed from the top support of the ladder?
6. How should you climb a ladder?
7. How should you carry tools when climbing a ladder?
8. How many hands should you be working with when standing on a ladder?
9. How should you carry a ladder?
10. What should you do with a ladder that’s broken?

WRAP-UP

Ladders are a common and useful tool, but like any tool, it must be used correctly. If used improperly, eventually an accident will happen. Falling from a ladder can severely injure or kill you. You may not always be lucky enough to land on your feet or be lucky enough to have the first thing that you hit be the ground. Use common sense and be safe.
Ladder Safety Do’s and Don’ts

DO:

* Select a ladder that’s the right length and weight capacity for the job.
* Inspect ladders before use.
* Make sure rungs and steps are in good condition and clean.
* Keep moving metal parts lubricated.
* Check for splinters and sharp edges.
* Check support braces, screws and bolts.
* Store ladders properly.
* Place ladders on firm, level surfaces.
* Place the feet of the ladder parallel to the top support.
* Anchor the top and bottom.
* Extend the top 3 feet above the top support.
* Angle the ladder so the bottom is one fourth the working distance from the top support.
* Position an extension ladder before extending it.
* Wear clean shoes.
* Face the ladder when going up and down.
* Use both hands when climbing or descending.
* Keep one hand on the ladder while working.
* Carry tools in your pocket on your belt.
* Stay between the side rails.

DON’T:

* Use boxes, chairs or tables as ladders.
* Use a metal ladder near electricity.
* Use a broken ladder.
* Use an extension ladder with a worn or frayed rope.
* Rest a ladder against a window or window sash.
* Place a alder in front of an unlocked or un-blocked door.
* Allow more than one person on a ladder at a time.
* Move a ladder while occupied.