SCAFFOLD SAFETY PROGRAM

1.0 PURPOSE
The Indiana University (IU) Scaffold Safety Program is to:
1.1 Ensure that employees who must use scaffolds are aware of safety measures to be used when working on scaffolding and when assembling and disassembling scaffolding
1.2 Ensure proper maintenance and repair of scaffolds and their components
1.3 Comply with the Indiana Occupational Safety and Health Act (IOSHA) and other applicable federal and state regulations

2.0 REGULATORY REFERENCES
IOSHA 29 CFR 1910.21, Walking-Working Surfaces, Definitions
IOSHA 29 CFR 1910.28, Walking-Working Surfaces, Safety Requirements for Scaffolds
IOSHA 29 CFR 1926.450, Scaffolds
IOSHA 29 CFR 1926.451, Scaffolds
IOSHA 29 CFR 1926.452, Scaffolds

3.0 SCOPE
This program is applicable to all Indiana University employees who use scaffolds to perform their jobs and to their supervisors and department heads.

4.0 ELEMENTS OF THE PROGRAM
4.1 Designing/Erecting/Assembling/Disassembling Scaffolding
Scaffolds shall be designed by a qualified person and shall be constructed and loaded in accordance with IOSHA 29 CFR 1926.451 and 1926.452.

Some key elements of the IOSHA standards are given below. However, any employee involved in the design of a scaffold must refer directly to the IOSHA standards for complete information.

Each scaffold/scaffold component shall be capable of supporting, without failure, its own weight plus at least four times the maximum intended load applied or transmitted to it.

Stationary scaffolds over 125 feet in height and rolling scaffolds over 60 feet in height shall be designed by a professional engineer. All equipment shall be inspected prior to use to ensure that it is in good condition and serviceable. Damaged or deteriorated equipment shall not be used.

Scaffold components manufactured by different manufacturers shall not be intermixed unless the components fit together without force and the scaffold’s structural integrity is maintained.

Scaffold components made of dissimilar metals shall not be used together unless a qualified person has determined that galvanic action will not reduce the strength of any component.

Each platform on all working levels shall be constructed in accordance with IOSHA 29 CFR 1926.451(b). Unstable objects cannot be used as a working platform. Supported scaffolds shall be restrained from tipping by guying, tying, bracing or the equivalent. Supported scaffolds shall rest on a firm foundation. Unstable objects shall not be used for support.
Before the scaffold is used the scaffold, including all direct connections, shall be evaluated by a competent person, who shall confirm that the supporting surfaces are capable of supporting the loads to be imposed.

4.2 Work Performed on Scaffolding
All work performed on or from a scaffold shall be done in accordance with IOSHA 29 CFR 1926.451 and 1926.452. When performing work such as:
   - 4.2.1 Working near electrical lines
   - 4.2.2 Welding from the scaffold platform

The worker must refer to 1926.451(f).

Each employee on a scaffold more than ten feet above a lower level must be protected from falling to the lower level. Acceptable fall protection for specific types of scaffolds and work situations is found in 1926.451(g).

Employees must be protected from falling objects, such as hand tools, debris, and other small objects. Employees must wear hard hats when working on or from a scaffold and debris nets, catch platforms, or canopies may also be required.

Large objects must be kept away from the platform edge and secured to prevent them from falling.

Where there is danger of tools, material, or equipment falling from a scaffold, the area below the scaffold shall be barricaded and no one shall be allowed to enter the barricaded area.

4.3 Maintenance and Repair of Scaffolding
All components of the scaffold shall be inspected by the competent person prior to erecting the scaffold. Any component that is damaged or shows significant wear shall not be used, but shall be removed from service until repaired or discarded. The competent person will also inspect the fully assembled scaffold to ensure its integrity and stability. Periodic inspections should also be performed. Inspections shall be documented.

At any time during an inspection or during normal operations a component is found to be damaged or significantly worn, work on the scaffold will not be permitted until appropriate repairs or replacement of components is accomplished and the scaffold re-inspected by the competent person.

Scaffold components shall be stored in such a manner that damage does not occur during storage.

5.0 ADMINISTRATION/COMPLIANCE/RESPONSIBILITIES
The Office of Environmental, Health, and Safety Management (EHS) has responsibility for the written scaffold safety program. EHS is also responsible for making certain the program meets current regulatory standards and that scaffolding users are informed of changes.
Department heads are responsible for identifying a “competent person” to identify existing and predictable hazards and to ensure such hazards are addressed before scaffolding is used. Department heads must also identify a “qualified person”, i.e. a person properly trained in design and assembly of scaffolds and has responsibility for those functions.

The “competent person” is the safety officer at the work site and has the authority and responsibility to take prompt corrective measures when hazardous conditions are recognized, including “stop work” when a situation is immediately dangerous to life or health. The competent person will oversee assembly/erection, moving, dismantling, or alterations in scaffolding.

The “qualified person” is responsible for designing scaffolds per approved engineering criteria and to meet the specific needs of the job.

Employees who assemble/erect, move, dismantle or alter scaffolding must do so per the direction of the “competent person” and the “qualified person”.

Employees working on the scaffolding must follow standard operating procedures and all safety requirements outlined in this program, the standard operating procedures and IOSHA regulations.

Failure to follow the above responsibilities may lead to disciplinary action.

6.0 TRAINING AND RECORDKEEPING

All employees whose jobs require they work from scaffolding shall be trained annually by a person qualified to recognize the hazards associated with the type of scaffold being used and the procedures to control or minimize those hazards, i.e., a “competent person”. The EHS department can provide this training, as well.

6.1 This training will include:

6.1.1 Proper use of scaffolds; standard operating procedures when working from scaffolds
6.1.2 Understanding maximum load capacities of the scaffolds
6.1.3 Proper handling of tools and materials when working from or on a scaffold
6.1.4 Nature of fall hazards and proper use of fall protection systems
6.1.5 Nature of electrical hazards and proper procedures for dealing with those hazards associated with falling objects in the area (specific to the job)

Employees who assemble/erect, dismantle, move, operate, maintain and repair, or inspect scaffolds will receive in addition to the above training:

6.1.6 Proper construction of specific scaffolds being used, including design criteria, maximum load capacity calculations
6.1.7 Placement of scaffolds
6.1.8 Care and maintenance of scaffolds
6.1.9 Hazards associated with erecting/dismantling scaffolds
6.1.10 Hazards associated with improperly constructed scaffolds
6.2 Retraining will be conducted when:
   6.2.1 There is reason to believe the employee lacks the skill or understanding to perform his/her job safely
   6.2.2 Changes at the work site present hazards the employee has not been trained to address
   6.2.3 Physical changes are made to the scaffold, fall protection or other equipment

6.3 Recordkeeping
All records of training are entered into and maintained in the EHS training database.

All records of scaffold design, erections, maintenance and repair shall be maintained by the Indiana University Physical Plant.
APPENDIX A: DEFINITIONS

**Capacity/Load:** The total load of all persons, equipment, and supplies expected to be applied to the scaffold.

**Competent Person:** One who has the authority and responsibility to take prompt corrective measures when hazardous conditions are recognized. The competent person will oversee assembly/erection, moving, dismantling or alterations in scaffolding.

**Erector:** An employee who is directly involved in assembling/erecting and dismantling the scaffold.

**Platform:** The elevated working surface of the scaffold.

**Qualified Person:** A person, for example, an engineer, who has received formal training in scaffold design and erection and has been deemed competent to do so.
**APPENDIX B: SPECIFIC PROCESURES**

This section may be used to append procedures specific to a department, job, or scaffold.

**Appendix B1: Fall Protection Requirements for Scaffolds**

<table>
<thead>
<tr>
<th>Types of Scaffold</th>
<th>Fall Protection Required</th>
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</thead>
<tbody>
<tr>
<td>Aerial Lifts</td>
<td>Personal fall arrest system</td>
</tr>
<tr>
<td>Boatswain’s chair</td>
<td>Personal fall arrest system</td>
</tr>
<tr>
<td>Catenary scaffold</td>
<td>Personal fall arrest system</td>
</tr>
<tr>
<td>Crawling board</td>
<td>Personal fall arrest system, or a guardrail system, or by a ¾ inch diameter grab line or equivalent handhold securely fastened beside each crawling board</td>
</tr>
<tr>
<td>Float scaffold</td>
<td>Personal fall arrest system</td>
</tr>
<tr>
<td>Ladder jack scaffold</td>
<td>Personal fall arrest system</td>
</tr>
<tr>
<td>Needle beam scaffold</td>
<td>Personal fall arrest system</td>
</tr>
<tr>
<td>Self-contained scaffold</td>
<td>Both a personal adjustable scaffold arrest system and guardrail system</td>
</tr>
<tr>
<td>Single-point and two-point suspension</td>
<td>Both a personal fall arrest system and guardrail system</td>
</tr>
<tr>
<td>scaffolds</td>
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<tr>
<td>Supported scaffolds</td>
<td>Personal fall arrest system or guardrail system</td>
</tr>
<tr>
<td>All other scaffolds not specific above</td>
<td>Personal fall arrest system or guardrail systems that meet the required criteria</td>
</tr>
</tbody>
</table>
Appendix B2: Specific Requirements for Specific Types of Scaffolds

Fabricated Frame Scaffolds
The structural members of fabricated frame scaffolds such as the legs, poles, posts, frames and uprights shall be plumb and braced to prevent swaying and displacement.

All fabricated frame scaffolds with a height to base width greater than four to one shall be restrained by guying, tying or bracing. Guys, ties or braces shall be placed:
B2.1 At the closest horizontal member to the four to one height and repeat vertically with the top restraint no further than the four to one height from the top;
B2.2 Vertically every 20 feet or less for scaffolds less than three feet wide and every 26 feet or less for scaffolds more than three feet wide; and
B2.3 Horizontally, at end at intervals not to exceed 30 feet from one end.

Specific Requirements:
B2.4 When moving platforms to the next level, the existing platform shall be left undisturbed until the new frames have been set in place and braced;
B2.5 To secure vertical members together laterally, frames and panels shall be braced by cross, horizontal, diagonal braces or a combination thereof. The cross braces shall be of such length as will automatically square and align vertical members so that the erected scaffold is always plumb, level and square;
B2.6 All brace connections shall be secured;
B2.7 Frames and panels shall be joined together vertically by coupling or stacking pins or equivalent means;
B2.8 Where uplift can occur which would displace scaffold end frames or panels, the frames or panels shall be locked together vertically by pins or equivalent means;
B2.9 Brackets used to support cantilevered loads shall:
B2.9.1 Be seated with side-brackets parallel to the frames and end-brackets at 90 degrees to the frames;
B2.9.2 Not be bent or twisted from these positions; and
B2.9.3 Be used only to support personnel, unless the scaffold has been designed for other loads by a qualified engineer and built to withstand the tipping forces caused by those other loads being placed on the bracket-supported section of the scaffold.
Form and Carpenter's Bracket Scaffolds
All form and carpenter's bracket scaffolds shall be constructed in accordance with the general platform and guardrail requirements for fabricated frame scaffolds.

Specific Requirements:
B2.10 All brackets, except those for wooden bracket scaffolds, shall be attached to the supporting formwork or structure by means of one or more of the following:
   B2.10.1 Welding
   B2.10.2 Hooking over a secured structural supporting member
   B2.10.3 Nails
   B2.10.4 A metal stud attachment device with the form wales either bolted to the form or secured by snap ties or tie bolts extending through the form and securely anchored
   B2.10.5 For carpenters bracket scaffolds only, by a bolt extending through to the opposite side of the structure's wall
B2.11 Wooden bracket-form scaffolds shall be an integral part of the form panel.
B2.12 Folding type metal brackets, when extended for use, shall be either bolted or secured with a locking-type pin.
Pump Jack Scaffolds
All pump jack scaffolds shall be constructed in accordance with the general platform and guardrail requirements for fabricated frame scaffolds.

Specific Requirements:
B2.13 Brackets, braces and accessories shall be fabricated from metal plates and angles with each pump jack bracket having two positive gripping mechanisms to prevent any failure or slippage.
B2.14 Poles shall be secured to the structure by rigid triangular bracing or equivalent at the bottom, top and other points as necessary. When the pump jack has to pass bracing already installed approximately four feet above the brace to be passed, it shall be left in place until the pump jack has been moved and the original brace reinstalled.
B2.15 When guardrails are used for fall protection, a workbench may be used as the top rail only.
B2.16 Workbenches shall not be used as scaffold platforms.
B2.17 When poles are made of wood, the pole lumber shall be straight-grained, free of shifting, large loose or dried knots, and other defects which might impair strength.
B2.18 When wood poles are constructed of two continuous lengths, they shall be joined together with the seam parallel to the bracket.
B2.19 When two by fours are spliced to make a pole, mending plates shall be installed at all splices to develop the full strength of the member.
Ladder Jack Scaffolds
All ladder jack scaffolds shall be constructed in accordance with the general platform and guardrail requirements for fabricated frame scaffolds.

Specific Requirements:
B2.20 Platforms shall not exceed a height greater than 20 feet.
B2.21 All ladders used to support ladder jack scaffolds shall meet 29 CFR 1926.452 Subpart X - “Stairways and Ladders”, except, that job made ladders shall not be used to support ladder jack scaffolds.
B2.22 The ladder jack shall be designed and constructed such that it will bear on the side rails and ladder rungs alone. If bearing on rungs only, the bearing area shall include a length of at least ten inches on each rung.
B2.23 Ladders used to support ladder jacks shall be placed, fastened or equipped with devices to prevent slipping.
B2.24 Scaffold platforms shall not be bridged to one another.
Crawling Boards

Specific Requirements:

B2.25  Boards shall extend from the roof peak to the eaves when used in connection with roof construction, repair, or maintenance; and

B2.26  Boards shall be secured to the roof by ridge hooks or by means that meet equivalent criteria (e.g., strength and durability).
Two-Point Adjustable Suspension Scaffolds

Specific Requirements:

B2.27 A competent person must evaluate all direct connections prior to use to confirm that the supporting surfaces are able to support the imposed load.

B2.28 All suspended scaffolds must be tied or otherwise secured to prevent them from swaying, as determined by a competent person.

B2.29 A competent person must inspect the ropes for defects prior to each work shift and after every occurrence that could affect a rope's integrity.

B2.30 When lanyards are connected to horizontal lifelines or structural members on two-point adjustable scaffolds, the scaffold must have additional independent support lines equal in number and strength to the suspension lines and have automatic locking devices.

B2.31 Emergency escape and rescue devices must not be used as working platforms unless designed to function as suspension scaffolds and emergency systems.
Counterweights
Counterweights used to balance adjustable suspension scaffolds must be able to resist at least four times the tipping movement imposed by the scaffold operating at either the rated load of the hoist or one and one-half (minimum times) the tipping movement imposed by the scaffold operating at stall load of the hoist, whichever is greater.

Only items specifically designed as counterweights must be used. Counterweights used for suspended scaffolds must be made of materials that cannot be easily dislocated. Counterweights must be secured by mechanical means to the outrigger beams. Vertical lifelines must not be fastened to counterweights.

Flowable material either in an open or closed container, such as water, cannot be used. Materials such as sand, gravel or roofing felt shall not be used as counterweights.

Suspension Ropes
Suspension ropes must be long enough to allow the scaffold to be lowered to the level below without the rope passing through the hoist. Drum hoists must contain no less than 4 wraps of the rope at the lowest point. Suspension ropes must:
B2.32 Be capable of supporting, without failure, at least six times the maximum intended load applied or transmitted to the rope. This includes connecting hardware used on non-adjustable suspension scaffolds; or
B2.33 Be capable of supporting two times (minimum) the stall load of the hoist, whichever is greater. The stall load of any scaffold shall not exceed three times its rated load.
B2.34 Wire rope shall be replaced when one or more of the following conditions exist:
   B2.34.1 Kinks
   B2.34.2 Six randomly broken wires in one strand
   B2.34.3 One third of the original diameter of the outside wires is lost
   B2.34.4 Heat damage
   B2.34.5 Evidence that the secondary brake has engaged the rope; or
   B2.34.6 Any other physical damages that impair the function and strength of the rope.
B2.35 Repaired wire rope shall not be used under any circumstance.

Suspension ropes supporting adjustable suspension scaffolds shall be a diameter large enough to provide sufficient surface area for the functioning of the brake and hoist mechanisms. When suspension ropes are near heat-processes, the ropes shall be shielded from the heat.

Power-Operated Suspension Scaffold Hoists
All power-operated hoists used to raise or lower a suspended scaffold must be tested and listed by a qualified testing laboratory. The stall load of any scaffold hoist must not exceed three times its rated load. The stall load is the load at which the motor engine of a power-operated hoist stalls or the power to which is automatically disconnected.

An automatic braking and locking device, in addition to the operating brake, must engage when a hoist makes an instantaneous change in movement or an accelerated over speed.
**Manually Operated Suspension Scaffold Hoists**
Manually operated hoists used to raise or lower a suspended scaffold must be tested and listed by a qualified testing laboratory. These hoists require a positive crank force to descend.

**Welding from Suspension Scaffolds**
Welding can be performed from suspended scaffolds when:

B2.36 A grounding conductor is connected from the scaffold to the structure and is at least the size of the welding lead.

B2.37 The grounding conductor is not attached in series with the welding process or the work space.

B2.38 An insulating material covers the suspension wire rope and extends at least four feet above the hoist.

B2.39 Insulated protective covers cover the hoist.

B2.40 The tail line is guided, retained, or both, so that it does not become grounded.

B2.41 Each suspension rope is attached to an insulated thimble.

B2.42 Each suspension rope and any other independent lines are insulated from grounding.

**Increase Working Level Height on Suspended Scaffolds**
No materials or devices shall be used to increase the working height on a suspension scaffold.

**Guardrails**
All scaffolds more than six feet above the lower level, must protect employees with guardrails on each open side of the scaffold. Guardrails shall be installed along the open sides and ends before releasing the scaffold for use by the employees, other than erection or dismantling crews.

Guardrails are not required:

B2.43 When the front end of all platforms are less than 14 inches from the face of the work.

B2.44 When outrigger scaffolds are three inches or less from the front edge.

B2.45 When employees are plastering and lathing 18 inches or less from the front edge.

Materials such as steel or plastic banding shall not be used for top rails or mid rails.
Specific Requirements:
B2.46 The platforms shall not be more than 36 inches wide unless designed by a qualified person.
B2.47 The platform shall be securely fastened to hangers by u-bolts.
B2.48 The blocks for fiber or synthetic ropes shall consist of at least one double and one single block. The sheaves of all blocks shall fit the size of the rope used.
B2.49 Platforms shall be of the ladder-type, plank-type, or light-metal type. Light-metal type platforms having a rated capacity of 750 pounds or less and platforms 40 feet or less in length shall be tested and listed by a nationally recognized testing laboratory.
B2.50 Two-point scaffolds shall not be bridged or otherwise connected one to another during raising and lowering operations, unless the bridge connections are articulated (attached), and the hoists properly sized.
B2.51 Passage may be made from one platform to another only when the platforms are at the same height, are abutting, and walk-through stirrups specifically designed for this purpose are used.
**Multi-level Suspended Scaffolds**

All multi-level suspended scaffolds shall be constructed in accordance with the counterweights, suspension ropes, power-operated suspension scaffold hoists, manually operated suspension scaffold hoists, welding from suspension scaffolds, increased working level height on suspended scaffolds, and guardrail and platform requirements for two-point adjustable suspension scaffolds.

**Specific Requirements:**
The requirements for multi-level suspended scaffolds are as follows:

B2.52 A competent person must evaluate all direct connections prior to use to confirm that the supporting surfaces are able to support the imposed load.

B2.53 All suspended scaffolds must be tied or otherwise secured to prevent them from swaying, as determined by a competent person.

B2.54 A competent person must inspect the ropes for defects prior to each work shift and after every occurrence that could affect a rope's integrity.

B2.55 When lanyards are connected to horizontal lifelines or structural members on single-point adjustable scaffolds or two-point adjustable scaffolds, the scaffold must have additional independent support lines equal in number and strength to the suspension lines and have automatic locking devices.

B2.56 Emergency escape and rescue devices must not be used as working platforms unless designed to function as suspension scaffolds and emergency systems.

B2.57 Scaffolds shall be equipped with additional independent support lines equal in number to the number of points supported and of equivalent strength to the suspension ropes and rigged to support the scaffold in the event the suspension rope(s) fail.

B2.58 Independent support lines and suspension ropes shall not be attached to the same points of anchorage.

B2.59 Supports for platforms shall be attached directly to the stirrup and not to disturb other platforms.
Mobile Scaffolds

Specific Requirements
The requirements for mobile scaffolds are as follows:

B2.60 A competent person shall evaluate all direct connections prior to use to confirm that the supporting surfaces are able to support the imposed load.

B2.61 Scaffolds shall be braced by cross, horizontal, diagonal braces, or combination thereof to prevent racking or collapse of the scaffold and to secure vertical members together laterally so as to automatically square and align the vertical members. All brace connections shall be secured.

B2.62 Scaffolds constructed of tube and coupler components shall also comply with the specific requirements for tube and coupler scaffolding.

B2.63 Scaffolds constructed of fabricated frame components shall also comply with the specific requirements for fabricated frame scaffolds.

B2.64 Scaffold casters and wheels shall be locked with a positive wheel and/or wheel and swivel locks, or equivalent means, to prevent movement of the scaffold while the scaffold is used in a stationary manner.

B2.65 Manual force used to move the scaffold shall be applied as close to the base as practicable, but not more than five feet above the supporting surface.

B2.66 Power systems used to propel mobile scaffolds shall be designed for such use. Forklifts, trucks, similar motor vehicles or add-on motors shall not be used to propel scaffolds, unless the scaffold is designed for such propulsion systems.

B2.67 Scaffolds shall be stabilized to prevent tipping during no movement. Employees shall not be allowed to ride on scaffolds unless the following conditions exist:

   B2.67.1 The surface on which the scaffold is being moved is within three degrees of level and free of pits, holes, and obstructions.
   B2.67.2 The height to base width ratio of the scaffold during movement is two to one or less, unless the scaffold is designed and constructed to meet or exceed the nationally recognized stability test requirements.
   B2.67.3 Outrigger frames, when used, are installed on both sides of the scaffold.
   B2.67.4 When power systems are used, the propelling force is applied directly to the wheels and does not produce a speed in excess of one foot per second.
   B2.67.5 No employee is on any part of the scaffold which extends outward beyond the wheels, casters, or other supports.

B2.68 Platforms shall extend outward beyond the base supports of the scaffold unless outrigger frames or equivalent devices are used to ensure stability.

B2.69 Where leveling of the scaffold is necessary, screw jacks or equivalent means shall be used.

B2.70 Caster and wheel stems shall be pinned or otherwise secured in scaffold legs or adjustment screws.
APPENDIX C: FORMS, LINKS TO FORMS (if applicable)

APPENDIX D: ADDITIONAL REFERENCES AND RELATED PROGRAMS (if applicable)

Indiana University Fall Protection Program