



Fall Protection Plan

Florida Institute of Technology (Florida Tech)

Environmental Health & Safety (EH&S)

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REVISION HISTORY

Revision Number	Revision Date	Revised By	Description of Change
00	2019-11-12	Charles Cherrito	Initial plan creation and implementation.
01	2021-02-04	Selvin McLean	Document review; review against federal register for updates.
02	2023-09-28	Selvin McLean	Document review; review against federal register for updates.

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PURPOSE

Florida Tech is required to foster an environment that prevents employees from falling off overhead platforms, elevated work stations, or into holes in the floor and walls.

The objective of the Florida Tech Fall Protection Plan is to identify and evaluate fall hazards to which employees will be exposed, and to provide specific training as required by the Occupational Safety and Health Administration (OSHA) Fall Protection Standard (see the “References” section of this plan for specific regulation sources).

SCOPE

This Plan pertains to all areas owned by Florida Tech in which fall protection is required for personnel safety. Additionally, this plan applies to outsourced contractors performing duties on Florida Tech campuses.

RESPONSIBILITIES

Environmental Health & Safety

The Environmental Health & Safety (EHS) Office will serve as the administrator for this Plan and a resource to assist in regulation interpretation and training. EHS may also periodically audit departments for compliance.

Departments

It is the responsibility of each Department to provide fall protection to affected employees, and to ensure that all employees understand and adhere to the procedures of this plan.

Supervisors

Supervisors (foreman, construction lead, responsible person) are the first line of supervision and are responsible for all personnel on their crew or jobsite. They must ensure employees are properly trained, are following all aspects of fall protection safety, and all aspects of this Plan. Additionally, they are to regularly audit their personnel for compliance.

DEFINITIONS

Definitions are denoted throughout this Plan within the specific section that they pertain.

HEIGHT REQUIREMENTS

When is fall protection required?

Although all departments should evaluate and consider fall protection anytime the hazard presents itself, OSHA requires that fall protection be provided at the following elevations:

Elevation (Feet')	Relation	Standard
4 feet or greater	General Industry	1910.28(b)(1)(i)
5 feet or greater	Shipyards	OSHA Site
6 feet or greater	Construction Industry	1926.501(b)(1)
8 feet or greater	Longshoring Operations	OSHA Site
Greater than 10 feet	Scaffolding	1926 Subpart L
More than 30 inches or 4 or more risers	Stairways	1926 Subpart X
Greater than 24 feet (includes top of ladder)	Fixed Ladder	1926.1053

The “No Minimum Height Rule”

OSHA requires that fall protection be provided when working over dangerous equipment and machinery, regardless of the fall distance.

Prevention requirements are:

- Guard every floor hole into which a worker can accidentally walk (using a railing and toe-board or a floor hole cover).
- Provide a guard rail and toe-board around every elevated open sided platform, floor or runway.
- Regardless of height, if a worker can fall into or onto dangerous machines or equipment (such as a vat of acid or a conveyor belt) employers must provide guardrails and toe-boards to prevent workers from falling and getting injured.
- Other means of fall protection that may be required on certain jobs include safety harness and line, safety nets, stair railings and hand rails.

HIERARCHY OF FALL PROTECTION

To choose the best solution for preventing falls, the use of a Hierarchy of Fall Protection (ranking of fall protection systems from best to worst) is a valuable method. The 5 categories, from best solution to worse case, are:

Hazard Elimination
Passive Fall Protection
Fall Restraint Systems
Fall Arrest Systems
Administrative Controls

❖ **Hazard Elimination**

The preferred solution to all fall hazards is elimination. The job task is evaluated to determine if a change in the procedure, practice, location or equipment will eliminate exposure to the fall hazard.

Example of Fall Elimination:

- Specifying that HVAC (Heating, Venting and Air Conditioning) systems be located on the ground, or in an equipment room rather than by the edge of the roof (or on a roof, in general). Doing so eliminates the requirement for the employee to be at elevation, essentially, eliminating the fall hazard.

❖ **Passive Fall Protection**

This type of fall protection utilizes a system that is non-dynamic, stationary, and does not move or adapt or change when in or out of use. They do not require the use of Personal Protective Equipment or active participation from the worker. Passive Protection is generally considered to provide a higher level of safety since the opportunity for error is less than using personal protective equipment (PPE). Examples include:

Platforms
Guard Rail Systems (Top-rails, Mid-rails, Toe-boards)
Boom or Scissor Lifts
Scaffolds
Handrails
Barriers
Skylight screens
Safety nets

❖ **Fall Restraint Systems**

Fall restraint systems are erected in such a manner that a fall cannot occur. Fall restraint systems use PPE to restrict the worker's range of movement so they cannot physically travel to the fall hazard. They are preferred over fall arrest systems because fall distance is not an issue for fall restraint systems, therefore arresting forces, clearance requirements, secondary injuries, and rescue issues are virtually eliminated.

They utilize a single point anchor (code-compliant anchorage system), horizontal lifeline (limited/fixed length lanyard), and a harness (full body), allowing workers to perform tasks at heights without going over the edge.

❖ **Fall Arrest Systems**

This is a system used to arrest a worker's fall from working surfaces if one occurs. It consists of a body harness, anchorage, connector, and a means to connect the body harness and anchorage such as a lanyard, deceleration device, lifeline, or a suitable combination of these.

Because the logistics in this system are more intense and detailed, this type of system will be further discussed in this document in a dedicated section (Fall Arrest Systems).

❖ **Administrative Controls**

Administrative controls are work practices or procedures that increase a worker's awareness of a fall hazard. It must be noted that administrative controls are the least preferred method of protection because they do not provide a physical or positive means of protection.

Although considered the last choice, administrative controls should be implemented along with previous preferred methods for added awareness. Some examples of administrative controls for fall protection are:

Warning Signs

Trainings

Implementing a Fall Protection Plan

FALL ARREST SYSTEMS

Introduction

Fall arrest systems are very similar to Fall Restraint, in that, they also utilize an Anchor, Lifeline, and Harness; however, a fall can still occur, but the fall is arrested. Fall arrest systems have a higher risk associated with them, since the falling worker must stop within an acceptable level of force and prevent them from contacting a surrounding structure or the ground.

The Components

The ABCs of a Fall Arrest System (Anchorage, Body Support, Connecting Device)

- ✓ Anchorage is a secure point to attach a lifeline, lanyard, deceleration device or any other fall arrest or rescue system. For example: structural steel members, precast concrete beams, or wooden trusses.
- ✓ A full-body harness (body support) is a body support device that distributes fall arrest forces across the shoulders, thighs, and pelvis; and has a center back fall arrest attachment for connection to the connecting device.
- ✓ A connecting device is used to link the body support component of the system to the anchorage connector, such as a shock-absorbing lanyard or self-retracting lanyard (SRL).

Understanding Fall Clearance

Calculating the fall clearance is one of the most important aspects of a Fall Arrest System. Fall clearance is the minimum vertical distance needed **between the anchor point and a lower level** (this can be the ground or lower obstruction) combined with a safety factor to prevent the worker from making contact in a fall.

SPECIAL NOTE!

The calculated minimum fall clearance may never be equal or greater than the distance between the anchor point and the lower level.

Calculating Fall Clearance

The below calculations take into consideration the two below systems (expected to be used):

- ✓ Shock-Absorbing Lanyard and D-Ring Anchorage Connector
- ✓ Retractable Lifeline

The below table can be utilized for assistance to calculate the minimum fall clearance required for a worker to mitigate injury in the event a fall does occur. Additionally, Examples 1 & 2 on page 10 of this plan each provide a scenario for both fall arrest system mechanisms mentioned above.

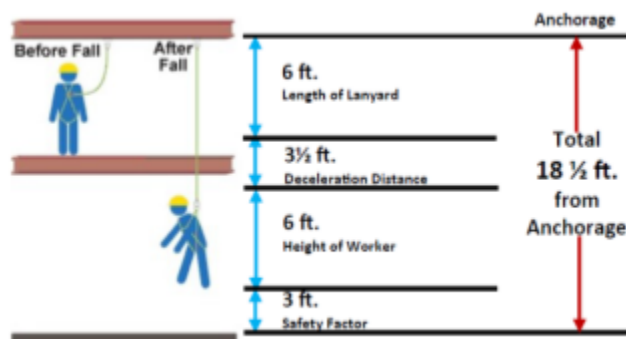
Description	Distance (ft.)
Lanyard Length or Free-Fall Distance for Self-retracting Lifeline	
Maximum Allowable Deceleration Distance	3 ½
Workers Height	
Other Component/Variable (if applicable)	
Safety Factor	3
Calculated Minimum Fall Clearance (sum of all the above)	

EXAMPLE 1:

SHOCK-ABSORBING LANYARD AND D-RING ANCHORAGE CONNECTOR

1. Add the length of the shock-absorbing lanyard (6 ft.) to the maximum elongation of the shock absorber during deceleration (3-1/2 ft.) to the average height of a worker (6 ft.).
2. Add a safety factor of 3 ft. to allow for the possibility of an improperly fit harness, a taller than average worker and/or a miscalculation of distance.
3. Should the shock-absorbing lanyard be used in conjunction with a cross-arm anchorage connector or other, the additional length of the anchorage connector must be taken into consideration.

Calculated Clearance = 18-1/2 ft. is the suggested safe fall clearance distance.

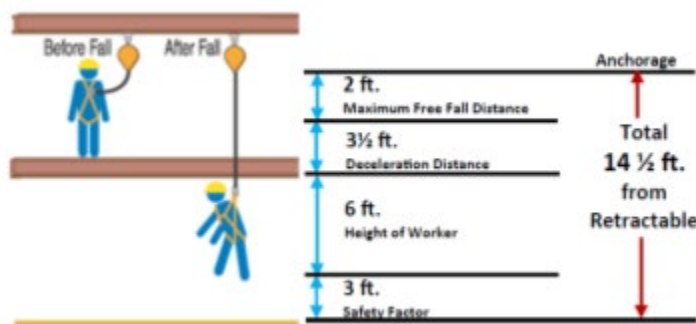


EXAMPLE 2:

RETRACTABLE LIFELINE

1. Add the maximum free fall distance (2 ft.) with a retractable lifeline to the maximum deceleration distance (3-1/2 ft.) to the average height of a worker (6 ft.).
2. Add a safety factor of 3 ft. to allow for the possibility of an improperly fit harness, a taller than average worker and/or a miscalculation of distance.
3. When using a retractable lifeline, the distance is calculated from the point where the retractable attaches to the back D-ring of the worker's harness.

Calculated Clearance = 14-1/2 ft. is the suggested safe fall clearance distance.



EQUIPMENT INSPECTION

Per OSHA 1910.140(c)(18), personal fall protection systems must be inspected before initial use during each work shift for mildew, wear, damage, and other deterioration, and defective components must be removed from service. Any equipment found to be defective or of concern must be brought to the attention of the employees' supervisor.

EQUIPMENT ACQUISITION

Individual departments must provide their employees with the proper PPE and/or fall protection equipment at no cost to the employee if there is a risk of fall. All fall protection equipment must meet the requirements in OSHA 1910.140.

Employees that feel there is a fall risk, but their supervisor/department has not deemed one as such may contact the EHS Office. EHS will conduct a Job Hazard Analysis (JHA) to address the concern. Upon completion of the JHA, the EHS Office will render a decision as to whether fall protection must be provided by the department to the employee. The department shall comply with such requirement.

SCAFFOLDS

A scaffold is any temporary elevated or suspended platform and its supporting structure used for supporting employees or materials or both. They are supported by legs, outriggers beams, brackets, poles, uprights, posts, frames, or similar rigid support.

All use of scaffolds shall comply with the requirements of Occupational Safety and Health Administration (OSHA) [29 CFR 1926 Subpart L](#) and [1910.28](#) as well as this plan.

The basic principles for fall protection will apply to scaffold users in addition to the below criteria.

Criteria for Support Scaffolds

The structural members, poles, legs, posts, frames, and uprights of all scaffolds must be plumb and braced to prevent swaying and displacement. Supported scaffolds with a height to base width ratio of more than 4:1 must be restrained by guying, tying, bracing or an equivalent means.

The following placements must be used for guys, ties, and braces:

- Install guys, ties, or braces at the closest horizontal member to the 4:1 height and repeat vertically with the top restraint no further than 4:1 height from the top;
- 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;
- Horizontally – at each end; at intervals not to exceed 30 feet from one end.

Supported scaffold poles, legs, posts, frames, and uprights shall be placed on base plates and mud sills or other adequate firm foundation (not unstable). They must be capable of supporting the loaded scaffold without settling or displacement.

Additionally:

- Front-end loaders and similar pieces of equipment shall not be used to support platforms unless they have been specifically designed by the manufacturer for such use;
- Fork-lifts shall not be used to support scaffold platforms unless the entire platform is attached to the fork and the fork-lift is not moved horizontally while the platform is occupied.

Guardrails

All scaffolds more than six feet above the lower level shall protect employees with guardrails on each open side of the scaffold. Guardrails shall be installed along the open sides and ends.

Guardrails are not required when:

- ✓ The front end of all platforms are less than 14 inches from the face of the work.
- ✓ When employees are plastering and lathing 18 inches or less from the front edge.

Falling objects

To protect employees from falling hand tools, debris, and other small objects, install toe boards, screens, guardrail systems, debris nets, catch platforms, canopy structures, or barricades. If there is a risk of falling objects or over-head hazard, a hard hat must be worn.

AERIAL LIIFTS & SCISSOR LIFTS

Personnel are to refer to the Florida Tech's "Aerial-Scissor Lift Plan" for information on practices, regulations, and fall protection regarding aerial lifts and scissor lifts.

FALL HAZARD ASSESSMENT

Supervisors should perform an assessment of any job-related task that has the potential for fall incidents. The below can be used for such an assessment and should be posted at each jobsite in which all employees are aware of its location. This assessment must be performed for tasks performed at a height greater than 6 feet for construction projects and 4 feet for all other projects.

1. Identify potential fall hazards (check all that apply):			
<input type="checkbox"/>	Mobile elevating work platforms	<input type="checkbox"/>	Stairways
<input type="checkbox"/>	Excavations/trenches	<input type="checkbox"/>	Roof steep slope (greater than 4:12)
<input type="checkbox"/>	Floor openings	<input type="checkbox"/>	Roof low slope (4:12 or less)
<input type="checkbox"/>	Wall openings	<input type="checkbox"/>	Swing fall
<input type="checkbox"/>	Skylight openings	<input type="checkbox"/>	Hazardous process/equipment
<input type="checkbox"/>	Roof openings	<input type="checkbox"/>	Debris/objects falling to lower level
<input type="checkbox"/>	Elevator shaft	<input type="checkbox"/>	Sharp edges
<input type="checkbox"/>	Ladders (fixed or portable)	<input type="checkbox"/>	Reinforcing steel installation
<input type="checkbox"/>	Scaffold	<input type="checkbox"/>	Other:
2. Describe the fall hazard(s) details:			
3. Identify fall protection systems to be used			
<input type="checkbox"/>	Guardrail system	<input type="checkbox"/>	Aerial lift
<input type="checkbox"/>	Covers (holes and openings)	<input type="checkbox"/>	Horizontal lifeline
<input type="checkbox"/>	Appropriate anchors for systems used	<input type="checkbox"/>	Vertical lifeline and rope grab
<input type="checkbox"/>	Personal fall arrest system	<input type="checkbox"/>	Warning line
<input type="checkbox"/>	Personal fall restraint system	<input type="checkbox"/>	Safety monitor
<input type="checkbox"/>	Positioning device system	<input type="checkbox"/>	Safety watch
<input type="checkbox"/>	Scaffold with guardrail	<input type="checkbox"/>	Other:
<input type="checkbox"/>	Scissor lift	<input type="checkbox"/>	Other:
4. Describe the assembly, maintenance, inspection, disassembly of fall protection system to be used:			
5. Describe procedures for handling, storage, securing tools and materials:			
6. Identify methods of overhead protection for workers who are in, or pass below worksite:			

<input type="checkbox"/>	Barricading	<input type="checkbox"/>	Toeboards/screens on scaffolds
<input type="checkbox"/>	Hard hats required	<input type="checkbox"/>	Toeboards/covers on floor openings
<input type="checkbox"/>	Catch net	<input type="checkbox"/>	Screens on guardrails
<input type="checkbox"/>	Warning signs	<input type="checkbox"/>	Secure large tools
<input type="checkbox"/>	Tool belts	<input type="checkbox"/>	Other:
<input type="checkbox"/>	Tool lanyards	<input type="checkbox"/>	Other:
7. Identify method for prompt, safe removal of injured workers CALL 911 IF FALL OCCURS			
<input type="checkbox"/>	Written agreement with:	<input type="checkbox"/>	Self-rescue
<input type="checkbox"/>	Site first aid	<input type="checkbox"/>	Other employees
<input type="checkbox"/>	Elevator/stairs	<input type="checkbox"/>	Other:
8. Identify method used to determine adequacy of anchorage points:			
<input type="checkbox"/>	Evaluation by professional engineer	<input type="checkbox"/>	Existing engineering/design documents
<input type="checkbox"/>	Manufacturer's data	<input type="checkbox"/>	Other:
9. Describe and identify locations of anchorage points:			
10. Select system components:			
<input type="checkbox"/>	Full body harness	<input type="checkbox"/>	Choker
<input type="checkbox"/>	Vertical lifeline	<input type="checkbox"/>	Carabiner
<input type="checkbox"/>	Horizontal lifeline	<input type="checkbox"/>	Rope grab
<input type="checkbox"/>	Lanyard	<input type="checkbox"/>	Personal shock absorber
<input type="checkbox"/>	Boatswains chair	<input type="checkbox"/>	Beamer
<input type="checkbox"/>	Connecting devices (identify)	<input type="checkbox"/>	Anchorage points (identify)
<input type="checkbox"/>	Other:	<input type="checkbox"/>	Other:
11. What is the calculated minimum fall clearance in feet?			
12. Work plan approval(s)			
Name of lead worker or supervisor		Signature	Date

TRAINING

All training records shall be retained for each employee. When Departments offer any training outside the Florida Tech's shared electronic system (e.g. in-person, off-site, etc.), they shall provide completed training documentation to the EHS department. All trainings conducted by Departments shall be in accordance with the Florida Tech Safety Training Policy.

Workers should be retrained annually, at minimum, and if any of the following conditions occur:

- o An accident occurs during aerial lift use,
- o Workplace hazards involving an aerial lift are discovered, or
- o A different type of aerial lift is used.
- o Workers who are observed operating an aerial lift improperly.

Additionally, all employees must receive specific training on the particular fall protection equipment they are assigned as well as any specific scaffold they are asked to use.

REFERENCES

[1910.140 Personal Fall Protection Systems](#)

[General Industry \(29 CFR 1910\)](#)

[Construction Industry \(29 CFR 1926\)](#)

[29 CFR 1926 Subpart M](#)

[29 CFR Parts 500-503](#)

[1926 Subpart L - Scaffolds](#)