

Safety Manual

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Approved By: Louisa V. Newman Director of Environmental Health & Safety	Signature:

Fall Protection

A. Purpose:

To outline and establish a formal procedure for protection of our employees from the hazards associated with falls from elevated surfaces at North Carolina Agricultural and Technical State University (NC A&T).

This procedure outlines the requirements for the use of fall protection when working on elevated surfaces. Developing and implementing a comprehensive managed fall protection standard is the most effective method to:

1. Identify, evaluate, and eliminate (or control) fall hazards through planning;
2. Ensure proper training of personnel exposed to fall hazards;
3. Ensure proper installation and use of fall protection and rescue systems; and
4. Implement safe fall protection and rescue systems.

B. Scope:

This procedure applies to all North Carolina A&T State University personnel, contractors or temporary personnel while working at the university and on its grounds. It is designed to protect employees working on surfaces (either horizontal or vertical) with an unprotected side or edge which is 4 or more feet above a lower level.

C. Responsibilities:

Plant Manager:

1. Provide resources to execute the fall protection program.
2. Develop and implement a policy statement that provides goals and guidance,
3. Appoint and support a qualified program administrator,
4. Identify and document fall hazards and eliminate or control every new fall hazard,
5. Develop and maintain written fall protection and rescue procedures,
6. Inform each authorized person about any foreseeable fall hazards,
7. Provide each authorized person with the knowledge and training necessary,
8. Provide competent persons to supervise authorized persons

EHS Director: Maintain Training records

Assistant EHS Director:

1. Developing, implementing, monitoring, and evaluating the managed fall protection program
2. Designate employees to serve in the following roles relative to this program;
 - a. Program Administrator;
 - b. Qualified Person;

- c. Competent Person;
 - d. Competent Rescuer;
 - e. Qualified Person Trainer, Competent Person Trainer, and Competent Rescue Trainer.
3. Assist in implementing this procedure and be a technical resource in guiding implementation;
4. Assess compliance status with the overall Fall Protection Program and the annual program effectiveness survey;
5. Cease any operation; which is identified as an inherently dangerous circumstance due to inadequate fall protection procedures; and
6. Review and provide necessary updates to this procedure on at least an annual basis.

Managers/Supervisors:

1. Work with site Health and Safety leaders to ensure that fall hazards are identified through fall hazard surveys and/or other methods for activities and areas for which they have responsibility;
2. Ensure that where fall protection equipment is required it is made available, used, and maintained in good condition;
3. Ensure that appropriate training has been conducted for those affected employees working in the facility; and
4. Ensure that their personnel are familiar with this procedure and adhere to its requirements.

Supervisors:

1. Ensure that personnel understand the purpose of this Fall Protection Program and that they have the knowledge, skills, and training required to adequately protect themselves from any fall hazards;
2. Assist with the completion of fall hazard surveys;
3. Exchange information about Saint-Gobain's Roaring River Fall Protection Program with outside contractors;
4. Provided Personal Fall Arrest Systems (PFAS) to authorized employees. (This would include locks and tags, standard lockout adapters, and other fixtures). and
5. Ensure that their personnel adhere to the requirements of this procedure.

Affected Employees:

1. May request a fall hazard survey or assessment of a specific task or area;
2. Comply with all requirements of this Fall Protection Program; and
3. Obtain the training and retaining specified in this procedure.

Authorized Employees/Authorized Person:

1. May request a fall hazard survey or assessment of a specific task or area;
2. Has a working understanding of and follows fall protection policies and procedures including the instructions of the Competent Person;
3. Identifies and appropriately communicates unsafe fall hazard conditions;
4. Takes proper care and use of all fall protection equipment;
5. Inspects all fall protection equipment prior to use; and
6. Obtain the training and retraining specified in this procedure.
7. Working understanding of and follows fall protection policies and procedures including the instructions of the competent person,

8. Identifies and appropriately communicates unsafe fall hazard conditions,
9. Takes proper care and use of fall protection equipment,
10. Inspects all fall protection equipment prior to use.

Qualified Person:

1. Supervises the design, selection, installation, and inspection of fall protection equipment,
2. Participates in investigation of all incidents, and
3. Meets the qualifications of a competent person.

Competent Person:

1. Supervises the managed fall protection program,
2. Knowledgeable through experience and training in all required components,
3. Conducts required fall hazard surveys,
4. Has the authority to stop work immediately,
5. Ensures written rescue plans are developed,
6. Identifies in writing the specific fall protection procedures that are required,
7. Identifies and imposes limits,
8. Makes adjustments to written fall protection program as directed by the program administrator,
9. Verifies that fall protection systems are appropriately installed and inspected,
10. Establishes clearance requirements and verifies their presence,
11. Removes damaged or unsafe PFAS equipment, and
12. Periodically inspects all PFAS equipment.

Competent Rescuer:

1. Anticipate and prepare for potential rescue scenarios before authorized persons start their work at heights,
2. Working understanding of and follows fall protection policies and procedures,
3. Verifies that all authorized rescuers have been adequately trained and are proficient at performing rescue,
4. Verify that the rescue equipment is protected against damage by workplace conditions,
5. Verifies that response procedures and rescue performances are reviewed at least annually.

Authorized Rescuer:

1. Performs or assists in workplace rescues,
2. Working knowledge of all equipment use and procedures necessary to perform a rescue,
3. Verifies that appropriate rescue needs are in place for workplaces where he/she has been authorized to perform rescues,
4. Verify that all equipment is suitable for use and properly protected, and
5. Consider their safety first in determining the method for performing a rescue.

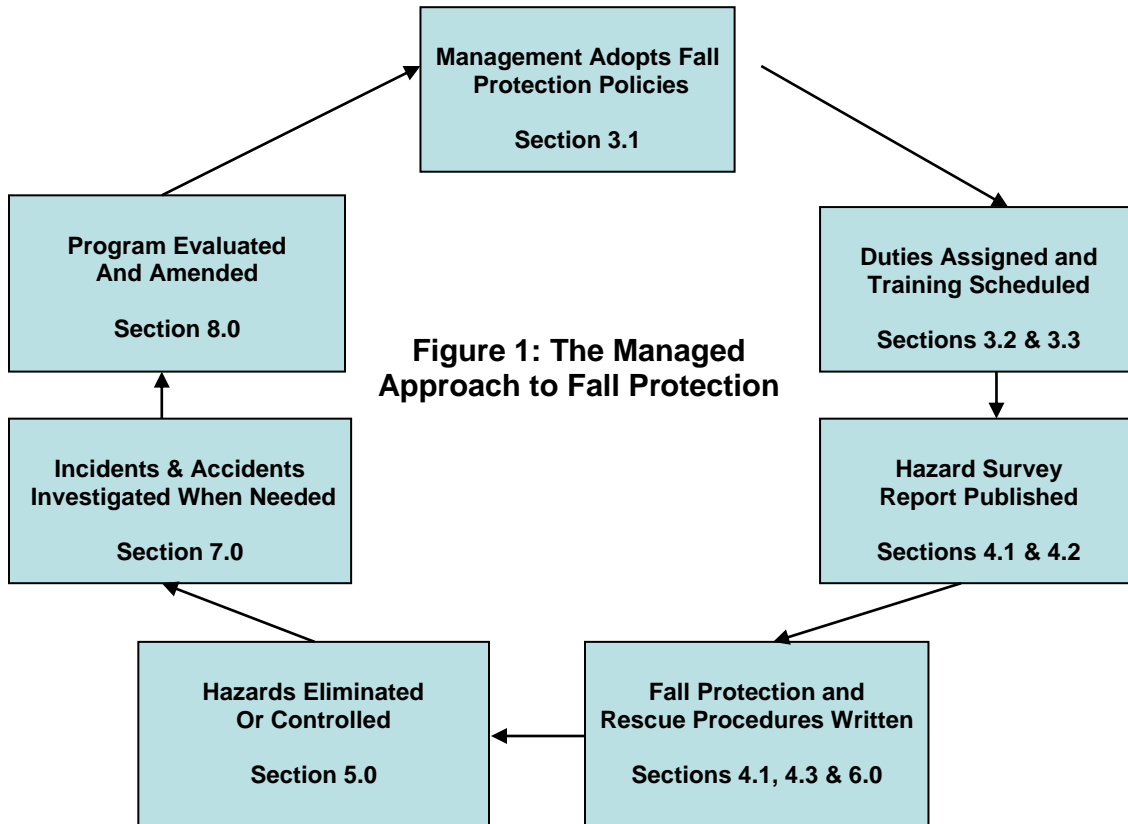
Qualified Person Trainer, Competent Person Trainer and Competent Rescue

Trainer: Have and be able to effectively communicate the knowledge regarding standards, regulations, equipment and systems for all fall protection and rescue and must evaluate the knowledge and skills of those they train.

D. Procedure:

1. Fall Hazard Survey:

There is the need to perform fall hazard surveys or use other fall hazard assessment methods to determine where additional or alternative fall protection methods might be required. Figure 1 below provides a flow chart detailing the process of implementing and maintaining an effective fall protection program. The section numbers referenced are from ANSI Z359.2-2007, Minimum requirements for a Comprehensive Managed Fall Protection Program.



Competent persons may perform fall hazard surveys that identify unprotected elevated work tasks and surfaces. Following are some exposures normally considered unprotected elevated work:

- Fixed Ladders - Ascending or descending fixed ladders which exceed 20 feet in height and are not equipped with a protective cage.
- Building or Tree Maintenance - Tasks that require climbing to a height of at least 4 feet to conduct maintenance.
- Leading Edges - Working within 6 feet of a leading edge that is 4 feet or more above lower levels.
- Hoist Areas - Working near unprotected hoist areas.
- Holes - Walking/working surfaces with holes more than 4 feet above lower levels.

- Excavations - Excavations 4 feet or more in depth not protected by the use of a guardrail system, fence, barricade or cover.
- Roofing Work - Working on sloped roofs with unprotected sides or edges 4 feet or more above lower levels.
- Wall Openings - Working on, at, above, or near a wall opening where the outside bottom edge of the wall opening is 4 feet or more above lower levels, and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface.
- Unusual Applications - There may be unusual applications where other configurations not addressed in this procedure may be present.

2. Fall Protection and Prevention Approaches:

a. Fall Prevention

The following are some of the fall prevention methods that may be used:

Covers for holes in floors, roofs, and other walking/working surfaces must meet the following requirements:

Covers located in roadways and vehicular aisles must be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover. All other covers must be capable of supporting at least twice the weight of personnel, equipment, and materials that may be imposed on the cover at any one time.

All covers must be secured when installed so as to prevent accident displacement by the wind, equipment, or personnel.

b. Guardrail systems

Guardrail systems used at an unprotected surface must meet the following requirements:

Be erected on all unprotected sides or edges of the hole.

Have not more than two sides provided with removable guardrail system sections to allow the passage of materials. When the hole is not in use, it must be closed over with a cover.

Be provided with a gate (at access points such as ladder ways), or be so offset that a person cannot walk directly into the hole.

Guardrail systems must be so surfaced as to prevent injury to personnel from punctures or lacerations. Guardrail systems and their use must comply with the following requirements:

Top rails must be 42 inches \pm 3 inches above the walking/-working surface.

The top rail must be capable of withstanding, without failure, a force of at least 200 pounds in any outward or downward direction, at any point along the top rail. If wire rope is used for top rails, it must be flagged at not more than 6-

foot intervals with high-visibility material. Wire, manila, plastic or synthetic rope being used for top rails must be inspected frequently to ensure it continues to meet strength requirements.

Midrails must be installed midway between the top rail and the walking/working surface. The midrail must be capable of withstanding, without failure, a force of at least 150 pounds applied in any outward or downward direction, at any point along the midrail. Wire, manila, plastic or synthetic rope being used for midrails must be inspected frequently to ensure it continues to meet strength requirements.

c. Personal Fall Arrest Systems

Personal fall arrest systems and their use must comply with the minimum provisions below.

Inspection - the user for wear, damage and other deterioration must inspect personal fall arrest systems each day of use. Defective components must be tagged and removed from service. The user is responsible for the safety equipment in his/her possession and all manufacturers' instructions must be followed.

System Requirements - Personal fall arrest systems, when stopping a fall must meet the following requirements:

1. Limit maximum arresting force on personnel to 1,800 pounds when used with a body harness.
2. Be rigged such that personnel can neither free-fall more than 6 feet or contact any lower level.
3. Bring personnel to a complete stop and limit maximum deceleration distance a person travels to 3.5 feet.
4. Have sufficient strength to withstand twice the potential impact energy of a person free-fall distance permitted by the systems, whichever is less.

Hoisting Areas - When a personal fall arrest system is used at hoist areas, it must be rigged to allow the movement of the personnel only as far as the edge of the walking/working Surface.

Equipment Used During Falls - Personal fall arrest systems and components subjected to impact loading must be immediately removed from service and must not be used again.

1. Body Harnesses - Body harnesses must be used only for personal protection (as part of a Personal Fall Arrest System restraint or positioning system) and not to hoist material. Body harnesses must be worn properly, affording a snug, yet comfortable fit. Body belts may not be worn as a substitute for body harnesses.
2. Connectors: D-Rings and Snap hooks (Carabiners) - D-rings and snap hooks (carabiners) must be of a locking type and must have a minimum tensile strength of 5,000 pounds and be proof-tested to a minimum tensile load of 3,600 pounds. All connectors must be dropforge, pressed or formed steel, or made of equivalent materials. They must have a

corrosion-resistant finish and all surfaces must be smooth to prevent damage to interfacing parts of the system.

3. Lanyards and Lifelines –

- Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds and must be protected against cuts or abrasions. Ropes and straps (webbing) used in lanyards must be made from synthetic fibers.
- Each person must be attached to a separate lanyard or lifeline.
- Lanyards must be secured properly to a body belt at the center of the wearer's back. Lanyards secured to a body harness (for fall protection) must be secured in the center of the wearer's back near shoulder level, or above the wearer's head.
- Lanyards must be secured in such a manner to afford the least free-fall distance possible up to a maximum of 6 feet and must not allow contact with objects below.
- Horizontal lifelines must be designed, installed, and used, under the supervision of a qualified person, as part of a complete Personal Fall Arrest System, which maintains a safety factor of at least two to one, as determined by the supervisor.
- Self-retracting lifelines/lanyards (retract locks or safety blocks) that automatically limit free-fall distance to 2 feet or less must be capable of sustaining a minimum tensile load of 3,000 pounds. The use of an additional lanyard should be avoided when using self-retracting lifelines/lanyards. The latching device on the self-retracting lifelines/lanyards must be connected directly to the body belt or harness, using the existing D-ring.

4. Anchorages

- Personal fall arrest equipment must be independently attached to an Anchorage capable of supporting at least 5,000 pounds per person or must be designed, installed, and used as part of a complete Personal Fall Arrest System which maintains a safety factor of at least two, as determined by a qualified supervisor. In the absence of other suitable points, a crane hook can be used as an Anchorage point for a lanyard or deceleration device provided that the hook can support at least 5,000 pounds, the load is not suspended (rigging can be in place but de-tensioned), and there is no hook movement (hoisting or lowering)

d. **Positioning Device System** –

Positioning device systems must be rigged such that the free-fall distance is limited to a maximum of 2 feet and must be secured to an anchorage capable of supporting at least twice the potential impact load of a person's fall or 3,000 pounds, whichever is greater.

e. **Safety Net Systems** –

Safety nets must be provided when working more than 25 feet above the lower level and the use of ladders, scaffolds, catch platforms, temporary floors, safety lines or personal fall arrest systems are impractical. Safety nets must be installed as close as practical under the walking/working surface on which personnel are working, but in no case more than 30 feet below such level.

3. Work on Roofs and other Tall Structures:

Access to roofs and other tall structures should be restricted. External vertical stairways or ladders should incorporate lockable sections to prevent unauthorized external access. Internal building access should also be restricted to authorized or emergency access by the use appropriate means.

Where regular access to roofs is required, a risk assessment should consider hazards such as sloping roofs, load bearing restrictions, unprotected edges, fragile materials, environmental conditions etc. Suitable control measures will have to be put in place such as training, walkways, edge and area fencing, and fall arrest provision.

For maintenance and repair work, or any work by contractors, a suitable recorded risk assessment (permit to work procedure) should be put in place. This should consider the likely risks and the suitable control measures to be put in place.

To ensure that proper procedures are followed, the facility will require the use of a ROOF PERMIT (FORM 1) to control access to the roof by facility personnel and by contractors. Permits will be issued by the Maintenance Manager, and completed permits will be kept on file as program documentation.

No employee is allowed on roofs of the plant with out first obtaining a permit from management. Fans must be locked out and a harness and lifeline must be worn if working with in 6 feet of the roof edge. Roof access doors must remain locked at all times.

4. Mobile Elevated Work Platforms (Cherry Pickers, Scissor Lift Platforms):

This equipment if used correctly by suitably trained personnel is a safe means of accessing difficult to reach equipment and structures. However, if used inappropriately or by unqualified personnel it has been a cause of fatalities. Training on this equipment is an essential requirement, and should include theory and supervised practice, which is unlikely to take less than 8 hours. Competent personnel should be issued with a license to permit them to operate the equipment. It is mandatory for operators and passengers to use suitable secured fall arrest equipment on entering the basket before it is elevated.

The equipment should be maintained according to the supplier's recommendations and be subject to competent independent annual inspections in addition to operator pre-start checks.

Key to safe operations of this type of equipment are:

- The manufacturers instructions and the limitations of use
- Having a suitable level operating surface. Work on any incline must be within design specification of the vehicle and there must be a means of preventing runaways.
- Environmental conditions, especially high wind.
- Use of out-riggers (where supplied)
- Hazards from overhead services
- Having a procedure to lower the basket if the machine fails while in the elevated position.

5. Portable Ladders and Step Ladders:

Portable ladders should only be used where it is impractical to use a secure fixed or mobile access platform. Personnel using ladders should be trained in their safe use.

Portable Ladders are inspected annually using FORM 3 PORTABLE LADDER INSPECTION.

6. Scaffolds and Temporary Access Platforms:

Every year many people are killed or injured in scaffold and access platform accidents. These are mainly caused by poor standards of erection and inappropriate use. If used and erected correctly this equipment is very safe work place, far safer than attempting to work from a ladder.

The equipment should be subject to an inspection schedule. In addition to daily use checks it should be inspected by a competent person upon erection and every 7 days while in use. A full annual component check should be carried out.

7. Fixed Ladders and Elevated Walkways and Platforms:

Fixed ladders are suitable for infrequent access or where room is restricted. Wherever reasonable a staircase should be installed rather than a vertical ladder. The ladders should be constructed to local national or international standards.

Specific requirements include a safety device if a fall of over 2.5 meters is possible. This should be a minimum of a safety cage if a single ladder run is less than 10 meters. If a single run is over 10 meters in height than a fall arrest system using a harness is required.

All vertical or near vertical ladders should be subject to an inspection system that ensures that they are inspected by a competent person at least annually. The results of these inspections and any work required should be recorded.

Personnel using ladders should be trained in the safe climbing techniques (i.e. maintaining three points of contact).

Access to vertical ladders should be restricted by physical means if there is a risk of non-authorized personnel using them. This tends to be a higher risk for external ladders that may attract trespassers and children.

Elevated platforms and walkways should be erected so that personnel can walk and work on them safely. Attention must be paid to an adequate secure construction able to take foreseeable loading. They should have suitable hand railing and kick plates.

All such sections of the plant should be inspected at least annually to ensure their structural integrity and that all safety elements are in place. FORM 4 FIXED LADDERS ANNUAL INSPECTION covers inspection requirement for these working surfaces. FORM 5 ELEVATED WORK SURFACES covers inspection of elevated work surfaces.

8. Stairs:

Falls on stairs account for a large number of accidents at work. Most of these are a result of people not taking care while climbing or descending. It is a requirement that employees hold the hand rail and negotiate one stair at a time while climbing or descending. The stairs should be structurally sound with suitable even treads and risers. Consideration should be given to reducing the slip potential of the stairs particularly if they are likely to become wet or icy.

Adequate lighting should be provided especially outside after dark. Suitable hand railing should be provided on all stairways.

Stairs will be inspected during the annual plant inspection tour.

9. Vehicles and Working at Height:

At our operational sites both finished goods and raw materials are transported by road or rail. A variety of vehicles are used, some of which require the drivers and others to work on top of the loads to secure the load and to sheet or un-sheet the vehicle. The company will provide suitable fall arrest equipment to enable this work to be carried out safely. This equipment may be located either inside the warehouse area or at a designated external location. This equipment will be maintained to a good safe standard and all regular haulers will be responsible for training their own personnel how to use the equipment. Irregular haulers will have to be given instructions how to use the equipment safely by site personnel.

The use of this equipment on CERTAINTEED CORP. sites will be mandatory.

10. Use of Tools at Height:

Tools and equipment can be an obvious hazard if dropped from a height. Holding tools while climbing ladders or stairs can also present risks. Suitable provision should be made for securing tools, such as the use of tool belts or tool bags.

11. Holes and Openings:

The creation of holes in floors and unprotected edges at height are a prime cause of serious incidents. Personnel working in the area should be provided with suitable fall protection systems and unauthorized personnel should be restricted from the area. Suitable barriers and warning signs should be erected. Access below such working areas should also be restricted. Any holes must not be left unattended without a suitable temporary cover.

12. Housekeeping:

It is essential that all work areas at height are rigorously kept clean and tidy. The consequences of any slips and trips at height or objects falling from height can be fatal.

13. Ground Level Provisions:

Where people are working overhead, the area below should be suitably barricaded with prominent warning signs to ensure that personnel below are not placed at risk.

Activities at ground level can also place the personnel at height at risk. Consider re-routing mobile plant or place substantial barriers if there is a risk of vehicles colliding with temporary access equipment.

14. Equipment Inspection:

Periodic inspections will be performed at least annually to assure that the Fall Protection Program continues to be implemented properly and that the employees are familiar with their responsibilities under those procedures.

15. Training:

NC A&T EHS will provide effective initial training and retraining as necessary and will certify that such training has been given to all employees covered by the applicable standards. The certification will contain each employee's name and dates of training.

Authorized Employee Training

Each Authorized employee shall receive initial and annual user level training encompassing the full scope of the Fall Protection Program including recognition of the fall hazards and methods for elimination and control.

Affected Employee Training

Each Affected employee shall receive initial and annual awareness level training in accordance with the purpose, scope, responsibilities and operating procedures for the Fall Protection Program.

Other Employee Training

Other employees shall receive initial and annual awareness level training covering the purpose and scope of the Fall Protection Program.

16. Program Review

The program will be reviewed at annually. FORM 040000 Fall Protection Standards Self-Audit Checklist is used as part of this review. Results of review will be reported to the EHS Committee during the 2nd QTR.