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SAFETY POLICY & PROCEDURE

Ladders

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1.0 Purpose

The purpose of this safety policy and procedure is to establish guidelines for the safe use of ladders throughout North Carolina Department of Transportation (NCDOT).

2.0 Scope and Applicability

Ladders are used when employees need to move up or down between two different levels. Slips, trips, and falls are significant contributors to incidents resulting in injuries to employees using ladders. Slips, trips, and falls can occur when wrong ladder selection is made, when improper climbing techniques, and/or defective ladders are used.

This safety policy and procedure provides guidelines for the safe use of ladders. It presents discussion on the types of ladders, the use of ladders, and inspection and maintenance requirements.

This document also details the areas of responsibility for managers/unit heads, supervisors, employees, and Safety and Risk Management.

This safety policy and procedure applies to all NCDOT employees who use ladders.

3.0 Reference

This safety policy and procedure is established in accordance with Occupational Safety and Health Standards for General Industry (29 CFR 1910.23) and Occupational Safety and Health Standards for the Construction Industry (29 CFR 1926.1053).

4.0 Policy

It is the policy of NCDOT to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. Therefore in NCDOT, the appropriate ladder will be used for the corresponding job and defective ladders shall not be used. When hazards exist that cannot be eliminated, then engineering practices, administrative practices, safe work practices, Personal Protective Equipment (PPE), and proper training regarding ladders will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees and the public.

5.0 General Responsibilities

It is the responsibility of each manager/unit head, supervisor, and employee to ensure implementation of NCDOT's safety policy and procedure on Ladders. It is also the responsibility of each NCDOT employee to report immediately any unsafe act or condition to his or her supervisor. Specific responsibilities are found in Section 6.3.

6.0 Procedure

This section provides applicable definitions, establishes general provisions, and identifies responsibilities required by NCDOT's safety policy and procedure on Ladders.

6.1 Definitions

Angle of Inclination

The preferred pitch for portable non-self-supporting ladders.

Articulated Joint

A portable ladder with one or more pairs of locking articulated joints which allow the ladder to be set up in several modes such as a straight or extension ladder, with or without a stand-off, as a regular or double front stepladder, scaffold or worktable.

Articulated Extendable Ladder

A portable ladder with one or more pairs of locking articulated joints and extendable sections which allow the ladder to be set up in several modes such as a straight or extension ladder, with or without a stand-off, as a regular or double front stepladder, scaffold, or worktable.

Cage or Well

A guard that may be referred to as a basket guard which is an enclosure that is fastened to the side rails of the fixed ladder or to the structure to encircle the climbing space of the ladder for the safety of the person who must climb a fixed ladder greater than 24' in height.

Combination Ladder

A portable ladder capable of being used either as a stepladder or as a single or extension ladder. It may also be capable of being used as a trestle ladder or a stairwell ladder. Its components may be used as single ladders.

Extension Ladder

Non-self-supporting portable ladder adjustable in length. It consists of two or more sections; (1) Base section, (2) Fly section/s) the fly section/s traveling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of these sections measured along the side rails. It is intended for use by one person.

Extension Trestle Ladder

A self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together.

Fixed Ladder

Ladder permanently attached to a structure, building, or equipment.

Ladder

A device with rungs, steps, or cleats used to gain access to a different elevation.

Ladder Feet

Allow the ladder legs to grip the ground and may be made of plastic or rubber to grab a flat surface. Some ladders will have feet with cleats that dig into the ground or surface and are hinged to the bottom of the leg in place of the feet.

Ladder Hinges/Spreaders

Folding pieces of metal used to firmly hold sections of a step ladder in place when spread apart.

Mobile Ladder Stand

A mobile, fixed-height, self-supporting ladder that usually consists of wheels or casters on a rigid base and steps leading to a top step. A mobile ladder stand will have handrails and is designed for use by one employee at a time.

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Mobile Ladder Stand Platform

A mobile, fixed-height, self-supporting ladder having a standing platform at the top that provide a means of access to items at elevated heights. Ladder portion will have handrails and standing platform will have guardrails and toe

Personal Fall Arrest System

A system used to arrest an employee in a fall from a walking-working surface. It consists of a body harness, anchorage, and connector. The means of connection may include a lanyard, deceleration device, lifeline, or a suitable combination of these.

Pitch

The included angle between the horizontal and the ladder, measured on the opposite side of the ladder from the climbing side. It is usually expressed as the ratio H/L, which is the horizontal distance H from the base of the ladder to the supporting surface divided by the working length L of the ladder.

Platform Ladder

A self-supporting portable ladder of fixed size with a platform provided at the intended highest standing level.

Rungs

Ladder crosspieces that are intended for use by a person in ascending or descending. Also referred to as steps or cleats.

Sectional Ladder

A non-self-supporting portable ladder, nonadjustable in length, consisting of two or more sections, and so constructed that the sections may be combined to function as a single ladder.

Special Purpose Ladder

A portable ladder that is either an experimentally designed ladder or a modification or assemblage of A14 approved requirements for design, testing or construction features of one of the general-purpose ladders defined elsewhere in this section, in order to adapt the ladder for special or specific climbing uses.

Stepladder

Self-supporting portable ladder with fixed height having flat steps and a hinged back.

Stepstool (ladder type)

A self-supporting, foldable, portable ladder with fixed height not exceeding 32 inches to the top cap with no pail shelf.

Top Cap

The uppermost horizontal member of a portable stepladder or step stool.

Top Step

The first step below the top cap of a portable stepladder or step stool. Where a ladder is constructed without a top cap, the top step is the first step below the top of the rails.

Trestle (Double Front) Ladder

A self-supporting portable ladder, non-adjustable in length, consisting of two sections, designed to be able to be climbed on by two (2) individuals simultaneously, one (1) per side and hinged at the top to form angles with the base.

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Working Load

The maximum applied load, including the weight of the user, materials, and tools, which the ladder is to support for the intended use.

6.2 General Provisions

This section details the provisions of this safety policy and procedure with each provision discussed in a separate subsection. These provisions are:

1. Training
2. Ladder Types
3. Capacity Ratings
4. Ladder Hazards
5. Ladder Use
6. Ladder Safety Devices for Fixed Ladders
7. Inspection

6.2.1 Employee Training

Employees using the ladders shall be trained upon initial job assignment in:

1. How to recognize hazards associated with ladders and procedures to minimize these hazards.
 - To minimize falls from ladders:
 - Follow manufacturer guidelines for acceptable use.
 - Place ladder on proper footing.
 - Do not use ladders on slippery surfaces.
 - Always face the ladder.
 - Secure step ladders by locking spreader bars at center of ladder.
 - Do not stand on top two steps of step ladders.
 - Do not overreach; reposition the ladder to avoid.
 - Extension ladders must be positioned a minimum distance of 3' past the edge of landing platform.
 - Extension ladders should be positioned with ladder feet 1/4th of the length to support point for the ladder which is about a 75-degree angle.
 - Electrical shock hazard:
 - Check for overhead electrical wires.
 - Maintain minimum clearance of 10' with overhead electrical lines.
2. The proper selection and use of portable ladders.
 - Use the correct capacity rating for weight of employee, clothing, PPE, or tool belt if worn.
 - Choose the correct ladder for application; refer to Section 6.2.2 for Ladder Types.
 - Step ladders will not be used as a single ladder (folded)
3. Ladder inspection requirements.
 - Ladders must not have any damage, lack of structural integrity, missing components, or loose parts.
 - Ladders must be free of oil, grease, or slippery materials.
 - Labels for ladders should be intact and readable.

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6.2.2 Ladder Types

There are many types of ladders used in NCDOT based on function and load capacity. They are classified as either portable or fixed designs.

Common types of portable ladders are step stool, step, platform, platform, single and extension ladders. Figure 1 illustrates examples of common portable ladders.



Figure 1

There are also multi-purpose ladders which are used for special applications meeting ANSI ladder standard which provide safe methods. Figure 2 illustrates examples of multi-purpose ladders.

- Lean Safe Ladders have a lower rear rail to front rail connection point allowing the user to get closer to the work when in stepladder mode.
- Multi-Purpose Ladders can be used on stairs utilizing multi-position adjustments for stair treads.
- Trestle Ladders are designed for two people to use at the same time, one of each side.
- Telescoping Ladders allow adjusting the height of the step ladder to suitable height

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required. For multiple purpose, it can also be used as an extension ladder.

- Extension Trestle Ladders allow extension ladder portion to access drop ceilings or remote access areas.



Figure 2

Fixed ladders are permanently attached to a structure or building. Existing fixed ladders are required to have cages for section extending 24' or greater. Existing fixed ladders manufactured after March 15, 1991, must have skid resistant rungs or steps.

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Any new fixed ladders over 24' installed after November 19, 2018, must have personal fall arrest or ladder safety system installed to prevent employees from falling or arresting their fall before contact with a lower level.

6.2.3 Capacity Ratings

All portable ladders have Capacity Ratings specified by the manufacturer for maximum working load limit with Duty Rating marked on side rails of ladder. NCDOT personnel should only acquire the Duty Rating that will safely accommodate weight of individuals including clothing, PPE, and tool belt if worn.

Type III Light Duty Portable Ladders shall not be purchased for use by NCDOT personnel. It is recommended that Type 1 Heavy-Duty Ladders be utilized. There may be instances where Extra-Heavy Duty or Special-Duty Ladders be used based on weight capacity requirements. Type II may only be used in office environments for painting or light duty operations. Validate step/extension ladder working load or duty rating with ladder capacity label and color coding.

1. **Type III – Light Duty Portable Ladder** - For users requiring a maximum 200-pound working load or duty rating. Generally, for Household use. Duty rating colors: Fiberglass ladders rails are **RED** in color; Aluminum ladders are **RED** in color on the base caps/pads and top cap
2. **Type II - Medium-Duty Portable Ladder** - For users requiring a maximum 225-pound working load or duty rating. Common use by some commercial painters, in office settings, and for light maintenance work. Duty rating color: Fiberglass ladders rails are **GREEN** in color; Aluminum ladders are **GREEN** in color on the base caps/pads and top cap.
3. **Type I - Heavy-Duty Portable Ladder** - For users requiring a maximum 250-pound working load or duty rating. Commonly used in factories and industrial settings, for utility work, and at construction sites. Duty rating color: Fiberglass ladders (Rails) are **BLUE** in color; Aluminum ladders are **BLUE** in color on the base caps/pads and top cap.
4. **Type IA – Extra Heavy-Duty Portable Ladder** - For users requiring a maximum 300-pound working load or duty rating. Commonly used in factories, industrial settings, for utility work, and construction sites. Duty rating color: Fiberglass ladders (Rails) are **ORANGE** in color, Aluminum ladders are **ORANGE** or **BLACK** in color on the base caps/pads and top cap.
5. **Type IAA - Special-Duty Portable Ladder** - For users requiring a maximum 375-pound working load or duty rating. Also used in factories, industrial settings, for utility work, and at construction sites. Duty rating color: Fiberglass ladders (Rails) are **YELLOW** in color; Aluminum ladders are **YELLOW** in color on the base caps/pads and top cap.

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6.2.4 Ladder Hazards

There are inherent hazards associated with ladder use. Typical ladder hazards include:

- Using incorrect ladder type for the job
- Exceeding duty rating ladder capacity
- Slippery rungs or steps on ladder
- Improper placement of ladder
- Reaching or leaning too far rather than moving ladder
- Standing on top step or rung of ladder
- Using a damaged ladder
- Using ladders near exposed electrical lines
- Using fixed ladders 24' or greater height without cages or fall protection

6.2.5 Ladder Use

Employees should follow certain rules when placing, ascending, and descending ladders which include:

- Read and follow Manufacturer's instructions.
- Inspect ladder for defects before using.
- Never use a defective ladder. Tag or mark it so that it will be properly repaired if feasible or discarded of and replaced. Render defective ladders unserviceable prior to disposal so no one attempts to retrieve for use.
- Single or extension ladder must extend a minimum of 3' above the landing surface (4 rungs).
- Use a 4 to 1 ratio when placing the base of a single or extension ladder distance away from the vertical landing platform height. (e.g. For a landing surface height of 12', place the ladder feet 3' away from base.)
- Use 3 points of contact when going up or down a ladder.
- Place tools in pockets or use tool belt to transport up or down ladder.
- Do not carry materials that could cause loss of balance and falling.
- If materials must be transported, raise, or lower it with a rope or other mechanism.
- Face the ladder when ascending or descending.
- Never slide down a ladder.
- Make sure the rungs or steps of ladder are not slippery or that shoes are not greasy, muddy, or slippery before climbing.
- Do not climb higher than the third rung from the top on straight or extension ladder, or the second tread from the top on stepladders.
- Never reach out or lean too far from the ladder. Move the ladder to avoid potential fall hazard.
- Never jump from a ladder. Always dismount from the bottom rung or step.
- Never attempt to adjust a ladder while a user is standing on the ladder.
- When using ladders in busy areas or doorways, erect barricades around the ladder and have someone direct traffic or hold the bottom of the ladder.

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- Store ladders in a safe secure area. Wooden and fiberglass ladders should be stored out of direct sunlight.
- Extension ladder base sections shall not be used as single/straight ladder (Fly sections removed), unless meets compliance standard/manufactures requirements. (Render unserviceable prior to disposal/being sent for recycling).
- Fly Sections of extension ladders do not meet compliance standard/ manufactures requirements and shall not be used/stored/utilized. These fly sections shall be (Render unserviceable prior to disposal/being sent for recycling).
- Extension ladders overlap requirement two (2) sections:
 - Up to 36 feet in length, the overlap must be at least three (3) feet.
 - 36 to 48 feet in length, the overlap must be at least four (4) feet.
 - 48 to 60 feet in length, the overlap must be at least five (5) feet.
- Properly tie off ladders whenever possible at or near the top for added stability. Tie off at the bottom if there is difficulty in maintaining stability. When tying off or untying the top, or if the ladder cannot be tied off, someone on the ground should hold the ladder to ensure it remains stable. Prior to performing ladder tying off refer to OSHA standards and manufacture instructions.

6.2.6 Ladder Safety Devices for Fixed Ladders

All fixed ladders extending 24' or greater installed prior to November 18, 2018 must have a cage, well, or personal fall arrest system or ladder safety system. New fixed ladders installed after November 18, 2018 must have ladder safety system or fall arrest system installed. On and after November 18, 2036, all fixed ladders are equipped with a personal fall arrest system or a ladder safety system.

1. Ladder Cage or Well is basket guard barrier enclosing or nearly enclosing the ladder's climbing space. (Figure 1)
2. Ladder Safety System consists of a permanent ladder safety rail or cable with fall arrest sleeve or traveler, where climber uses a full body harness with front D-ring, lanyard, and connectors. (Figure 2)
3. Ladder Personal Fall Arrest System consists of a full body harness, ladder or fixed anchorage point, lanyard, vertical lifeline, and connectors. Vertical retractable lanyard may be used in place of lifeline. (Figure 3)



Figure 1



Figure 2



Figure 3

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6.2.7 Inspection

Before using a ladder, inspect for defects prior to use:

- Look for damaged side rails, rungs, or supports including UV damage.
- Check for bent or corroded metal.
- Check for loose, missing, broken, or cracked, or splintered rungs, rails, steps, spreaders, other locking devices, feet, or top caps.
- Ensure nuts, bolts, or rivets are tight and that the ladder feet are secure.
- Test the ladder for stability.
- Make sure rungs and feet are not slippery.
- Check the label to ensure it is legible and verify load rating is sufficient.
- Inspect ladders immediately for damage after tip over or exposure to chemicals or fire.

After using a ladder, inspect for any newly acquired defects which could affect the safety of the next person who uses it. If the ladder falls, has been exposed to severe strain, or is struck with enough force to cause damage during use:

- Look for any new dents or damage to side rails, rungs, and supports.
- Check for bends or malformations and any loosening of nuts, bolts, and rivets.
- Retest the ladder's stability.
- If the ladder is damaged, take it out of service and tag ladder with "Do Not Use". Ladder should be repaired if feasible or disposed of and replaced.

Periodic inspection of all step and extension ladders by a Competent Person is required at 6-month intervals and documented. See Appendix A for Ladder Inspection Checklist and Log.

6.3 Specific Responsibilities

6.3.1 Managers/Unit Heads

Managers/Unit Heads are responsible for ensuring that adequate funds are available and budgeted for the purchase of ladders in their areas.

Managers/Unit Heads will obtain and coordinate the required training for the affected employees. Managers/Unit Heads will also ensure compliance with this safety policy and procedure through their auditing process.

6.3.2 Supervisors

Supervisors are responsible for ensuring that all ladders (fixed and portable) are regularly inspected and properly maintained. They will also be responsible for tagging ladders and removing defected ladders from service for repair or destruction.

Supervisors will audit for compliance with this safety policy and procedure during their facility and jobsite audits.

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6.3.3 Employees

Employees shall comply with all applicable guidelines contained in this safety policy and procedure.

Employees are also responsible for reporting immediately suspected unsafe conditions or ladders to their supervisor. Employees shall inspect ladders before and after use and are to keep ladders clean and in good condition. Damaged ladders will not be used and tagged out of service until repair or rendered unserviceable for proper disposal or recycle.

6.3.4 Safety & Risk Management

Safety and Risk Management will provide prompt assistance to manager/unit heads, supervisors, or others as applicable on any matters concerning this safety policy and procedure. Safety and Risk Management will assist in developing or securing the required training.

Safety Engineers, Consultants, and Officers will provide consultative and audit assistance to ensure effective implementation of this safety policy and procedure.

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Appendix A Ladder Inspection Checklist and Log

LADDER INSPECTION

Periodic Ladder Inspection required every 6 months for all Step Ladders and Extension Ladders. Use inspection form and log below to document. Each ladder will need to be assigned a Ladder #.

STEPLADDER



- Steps:**
Loose, cracked, bent, or missing
- Rails:**
Cracked, bent, split or frayed rail shields
- Labels:**
Missing or not readable
- Pail Shelf:**
Loose, bent, missing, or broken
- Top:**
Cracked, loose, or missing
- Spreader:**
Loose, bent, or broken
- General:**
Rust, corrosion, or loose
- Other:**
Bracing, shoes, or rivets

EXTENSION LADDER



- Rungs:**
Loose, cracked, bent, or missing
- Rails:**
Cracked, bent, split, or frayed
- Labels:**
Missing or not readable
- Rung Locks:**
Loose, bent, missing, or broken
- Hardware:**
Damaged, loose, or missing
- Shoes:**
Worn, broken, or missing
- Rope / Pulley:**
Loose, bent, or broken
- General:**
Rust, corrosion, or loose
- Other:**
Bracing rivets

Ladder #	Location	Pass/ Defect	Date

NOTE: Defective Step Ladders must be tagged "Do Not Use" and taken out of use.

Ladder #	Location	Pass/ Defect	Date

NOTE: Defective Extension Ladders must be tagged "Do Not Use" and taken out of use.