

Module: Ropes and Knots

Description

This module prepares students to use ropes and knots to safely lift tools and equipment from the ground up to upper floors, roofs, or other areas above ground during firefighting operations. Students will learn which knots are best for different tools, how to tie them properly, and how to hoist equipment without causing damage or injury. They will also learn how to take care of the ropes they use by cleaning, inspecting, and storing them according to best practice and manufacturer guidelines. This is important because using the right knot and rope can prevent accidents, protect equipment, and help firefighters do their jobs safely and efficiently.

Module Outcome

At the end of this module, the Firefighter I student will be able to hoist firefighting tools and equipment to an upper level by selecting the correct rope, rigging tools using appropriate knots, and following safe hoisting procedures using utility rope, webbing, and tool attachments under fireground conditions to support operations and prevent injury and equipment damage.

Standards

This module aligns to the applicable standards in

- NFPA 1010 *Standard on Professional Qualifications for Firefighters* (2024)
- NFPA 1410 *Standard on Training for Emergency Scene Operations* (2020)

This module directly supports two Job Performance Requirements (JPRs) from NFPA 1010.

Table 1: Module Standards NFPA 1010 (2024) Standard on Professional Qualifications for Firefighters Chapter 6 — Firefighter I (NFPA 1001)	
Standard	Requisite Knowledge or Skills
6.3.20 Tie a knot appropriate for hoisting tools	<ul style="list-style-type: none">• Knot types and usage;• Difference between life safety and utility rope;• Reasons for placing rope out of service;• Types of knots to use for given tools, ropes, or situations;• Hoisting methods for tools and equipment;• Using rope to support response activities.• Hoisting tools using specific knots based on the type of tool.
6.5.1* Clean and check ladders, ventilation equipment, SCBA, ropes, salvage equipment, and hand tools,	<ul style="list-style-type: none">• Types of cleaning methods for various tools and equipment• Correct use of cleaning solvents• Manufacturer's or departmental guidelines for cleaning equipment and tools.

Table 1: Module Standards**NFPA 1010 (2024) Standard on Professional Qualifications for Firefighters****Chapter 6 — Firefighter I (NFPA 1001)**

Standard	Requisite Knowledge or Skills
	<ul style="list-style-type: none"> • Selecting correct tools for various parts and pieces of equipment • Following guidelines, and complete recording and reporting procedures.

The NFPA defines requisite knowledge and requisite skills as the minimum a student needs to know and be able to do in order to accomplish the task defined in the JPR.

**Note**

Students must be able to tie the representative knots, bends, or hitches for the following purposes: (1410, **11.6.1**)

- (1) End-of-line loop
- (2) Midline loop
- (3) Securing rope around desired objects
- (4) Joining rope or webbing ends together
- (5) Gripping rope

While any appropriate knot can be taught to meet these requirements, instructors should consider the amount of practice time available for students to demonstrate competence in several different knots.

Module Learning Objectives

By the end of this module, Firefighter I students will:

Table 2: Learning Objectives**Module: Ropes and Knots**

ID	Objective	Alignment
LO1	Tie basic fire service knots, given utility rope and a tool to be hoisted, so that the tool is secured, and the knot is tied correctly, dressed and tightened, stable under tension and does not slip, can be untied after use, and supports the load for safe hoisting.	6.3.20; 11.6.1
LO6	Select an appropriate knot, given a tool or piece of equipment and a specific hoisting need, so that the knot selected matches the purpose and allows safe hoisting.	6.3.20
LO7	Hoist a tool, given utility rope and an assigned tool, so that the tool is raised safely to an upper level without damage or uncontrolled movement.	6.3.20
LO8	Clean a utility rope, given a soiled rope and departmental cleaning supplies, so that the rope is free of debris and cleaned in accordance with manufacturer guidelines.	6.5.1

Table 2: Learning Objectives
Module: Ropes and Knots

ID	Objective	Alignment
LO9	Inspect a utility rope, given a training rope and department inspection forms, so that damage is identified, recorded, and reported per agency procedures.	6.5.1
LO10	Place a damaged rope out of service, given a utility rope with visible damage and department policy, so that the rope is tagged or marked and removed from operational use.	6.5.1

Prerequisites

The prerequisites for this module are:

- Personal Protective Equipment (PPE) & Self-Contained Breathing Apparatus (SCBA)
- Tools & Equipment

This module will require students to tie fire service knots correctly, rig tools for hoisting, and safely lift them using rope. They will need to repeat these tasks until they can perform them without help. Some students may struggle to tie knots while wearing gloves or working with heavy or awkward tools and may need demonstration on hand positions and ways to control the rope. This module will also require students to clean, inspect, and remove damaged rope from service using approved steps. These skills build on earlier training with tools and PPE and prepare students for later fireground scenarios where they will use rope skills in full gear under pressure.

Connections to Other Learning

The knowledge in this module specifically supports the following standards in other modules:

Table 3: Connections to Supported Standards
NFPA 1010 (2024) Standard on Professional Qualifications for Firefighters
Chapter 6 — Firefighter I (NFPA 1001)

Standard	Requirement
6.1.2 General Skills Requirements.	<ul style="list-style-type: none"> • Required to hoist tools and equipment using ropes and the correct knot
6.3.10* Attack an interior structure fire operating as a member of a team	<ul style="list-style-type: none"> • Required to know about attack and control techniques for above grade level fires

The use of ropes and knots appear again when students come back for higher level training and education. Concepts of this module are integrated into most technical rescue programs.

Coherence

What Students Have Learned Previously	What Students Are Learning Now	What Students Will Learn Later
<ul style="list-style-type: none">▪ Tools and Equipment. Students will be able to identify, name, and handle common firefighting tools and equipment.	<ul style="list-style-type: none">▪ Rigging and Hoisting. Student are learning the selection of appropriate knots, the rigging of tools for hoisting, and the safe performance of basic hoisting tasks using utility rope.	<ul style="list-style-type: none">▪ Application During Evolutions. Later modules, such as ventilation and ladders, will incorporate rope skills into multi-step fireground evolutions.

Boundaries of Instruction and Assessment

This module does not include instruction on rope rescue skills or the construction and use of hauling systems.

Module Assessments

The following skills are required to be taught and practiced during this module. These skills should be evaluated through formative assessment during instruction. The ability of students to tie the representative knots, bends, or hitches for the following purposes shall be evaluated:

Table 4: Formative Assessments Module: Ropes and Knots			
ID	Description of Skill	Standard	Description of Assessment
FA-01	Tie an end-of-line loop	11.6.1	Students will tie an end-of-line loop in a utility rope so that the knot is secure, and the loop is appropriately sized for the application.
FA-02	Tie a midline loop	11.6.1	Students will tie a midline loop in a utility rope so that the knot is secure, and the loop is appropriately sized for the application.
FA-03	Secure a rope around objects	11.6.1	Students will tie a utility rope around an object so that the rope or the object is secure.
FA-04	Join rope or webbing ends together	11.6.1	Students will join two ends of rope or webbing together so that the two pieces of material are securely connected.
FA-05	Tie a gripping knot	11.6.1	Students will attach one rope to another using a gripping knot so that the knot does not slip when placed under tension.
FA-06	Hoist a tool	6.3.20	Students will move a tool a minimum of 14 ft vertically so that control of the tool is maintained.
FA-07	Clean and maintain rope	6.5.1	Students will clean and maintain utility rope using approved cleaning supplies so that the rope is returned to a ready state or reported otherwise.

The following criteria must be assessed during summative assessment and certification testing.

Table 5: Summative Assessments Module: Ropes and Knots	
Standards Assessed	Description of Assessment
Use appropriate knots to secure and hoist tools as directed. (6.3.20)	The evolution shall begin when the evaluator initiates the evaluation and conclude when the evaluator is satisfied that the knot or hitch has been tied correctly and the tools or appliance have been hoisted a minimum of 14 ft (5 m).

Module Completion Criteria

To successfully complete this module, students must demonstrate all skills listed in Table 4.

Preparation, Materials, and Resources

Student Preparation

Students should review the relevant materials in their assigned textbook.

Instructor Preparation

- Read and annotate the relevant chapters in the textbook.
- Review other book chapters or supplemental material.
- Review and annotate the associated lesson plans and standard evolutions for this module.

Materials and Resources

- x

Key Terms

- **Term.** Definition. (Reference)

Revision History

The following table is provided as a quick reference.

Table 6: Revision History Module: Ropes and Knots	
Revision Date	Revision Description
	No revisions

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Module Outline

Table 7: Progression of Higher-Order Thinking Module: Ropes and Knots	
Depth of Knowledge (DOK)	How It's Applied in the Module
DOK 1 (Recall)	Identify knot names, rope types, and cleaning guidelines in the online lessons
DOK 2 (Skill/Concept)	Match knots to purposes; follow procedures to inspect, clean, and store ropes
DOK 3 (Strategic Thinking)	Select and tie appropriate knots based on tool shape, weight, and hoisting need
DOK 4 (Extended Thinking)	Apply knowledge in a timed scenario requiring decision-making under pressure and teamwork in simulated fireground conditions

Module: Ropes and Knots	
Block 1: Introduction to Ropes and Knots	
Lesson 1: Introduction to Fire Service Rope Work (-- minutes)	
Learning Objectives LO6 Select an appropriate knot LO7 Hoist a tool	
Enabling Learning Objectives <ol style="list-style-type: none"> 1. Describe common fireground tasks that require tool hoisting, so that the purpose of knot selection is linked to operational needs. (LO6) 2. Identify the difference between utility rope and life safety rope, so that each type is matched to appropriate uses. (LO6) 3. Explain the role of tool hoisting in supporting fireground operations, so that the value of rope skills in emergency response is described. (LO7) 4. List the characteristics of a properly selected knot for specific fireground tasks, so that knots are selected based on function, load, and ease of use. (LO6) 	
Content Outline	Resources
<ul style="list-style-type: none"> ▪ Introduction (Motivation and Overview) <ul style="list-style-type: none"> • Importance of rope skills in fireground operations • How this module supports safe and effective tool use ▪ Purpose of Rope Use on the Fireground (ELO1) <ul style="list-style-type: none"> • Common fireground scenarios requiring tool hoisting <ul style="list-style-type: none"> ▪ Roof ventilation or overhaul ▪ Upper-floor tool support ▪ Hose advancement support • Advantages of hoisting over manual carry <ul style="list-style-type: none"> ▪ Reduces fatigue 	Activities Materials Facilities Notes

Module: Ropes and Knots

Block 1: Introduction to Ropes and Knots

- Increases safety and efficiency
- Hazards prevented by proper rope use
 - Dropped tools
 - Damage to equipment
 - Risk to personnel below
- **Types of Rope and Their Applications (ELO2)**
 - Utility Rope
 - Common materials (nylon, polypropylene)
 - Typical uses: tool hoisting, hose dragging, marking
 - Load capacity considerations
 - Life Safety Rope
 - Required characteristics per NFPA 1983
 - Uses: victim rescue, firefighter self-rescue (not covered in this module)
 - Minimum strength ratings, construction, inspection rules
 - Labeling, Storage, and Marking
 - How ropes are marked by function
 - Visual and physical identification methods used by fire departments
- **Overview of Tool Hoisting Operations (ELO3)**
 - General sequence of tool hoisting
 - Anchoring, rigging, raising, and lowering
 - Examples of tools commonly hoisted
 - Axes, Halligans, power saws, hose rolls, pike poles
 - Matching knot and method to the tool's characteristics
 - Weight, balance, handles, shape
 - Safety considerations
 - Personnel positioning
 - Load control
 - Communication and hand signals
- **Selecting the Right Knot for the Task (ELO4)**
 - Criteria for selecting a knot
 - Function: loop, hitch, bend, grip
 - Load: static or dynamic
 - Operational need: security vs. ease of release
 - Example scenarios
 - Tool with handle vs. without handle
 - Tool that must be released quickly
 - Introduction to knot families (preview of next lesson)
 - End-of-line (figure-eight follow-through)

Module: Ropes and Knots

Block 1: Introduction to Ropes and Knots

- Midline (figure-eight on a bight)
- Gripping (prusik, clove hitch)
- Joining (square knot, water knot)

Lesson 2: Knots and Their Functions

(-- minutes)

Learning Objectives

LO1 Tie basic fire service knots

Enabling Learning Objectives

1. Identify common end-of-line loop knots, given labeled images and descriptions of knot types, so that the knot is named and matched to the correct function. (LO1)
2. Describe the function of midline loop knots, given diagrams and a list of fireground tool scenarios, so that the knot's purpose is explained in relation to its placement on the rope. (LO1)
3. Match securing knots to fireground tools, given visual scenarios and tool descriptions, so that the knot selected corresponds to the tool's shape, weight, and need for stability or release. (LO1)
4. Identify appropriate knots for joining rope or webbing, given illustrations and simulated load conditions, so that each knot is selected based on its ability to maintain connection under tension. (LO1)
5. Explain the use of gripping knots, given a hoisting situation and a description of available knots, so that the knot is chosen based on its ability to maintain position and grip on the rope. (LO1)

Content Outline

- **Introduction to Knot Function in Fire Service Context**
 - Review connection to Lesson 1 (when and why rope is used)
 - Emphasize the importance of knot selection to fireground safety
 - Orient students to upcoming lab performance expectations
- **End-of-Line Loop Knots (ELO1)**
 - Purpose of end-of-line loops in hoisting and anchoring
 - Example: hoisting a tool with no open end
 - Common knots: Figure-eight on a bight, bowline
 - Visual identification of features: fixed loop, load orientation
 - Best uses and limitations for each knot type
- **Midline Loop Knots (ELO2)**

Resources

Activities
Materials
Facilities
Notes

Module: Ropes and Knots

Block 1: Introduction to Ropes and Knots

- Purpose of midline loops: branching a load or creating an attachment point away from the rope's end
- Common knots: Alpine butterfly, directional figure-eight
- Visual and animated breakdown of structure
- Use case examples: attaching secondary tool or redirect
- **Securing Knots (Hitches) (ELO3)**
 - Role in securing rope around tools or anchor points
 - Tools with handles vs. smooth tools
 - Common hitches: clove hitch, round turn with two half hitches
 - Considerations: stability under tension, ease of untying
 - Matching knots to tool weight and shape
- **Joining Knots (Bends and Webbing Knots) (ELO4)**
 - Purpose: extending rope length or forming loops with webbing
 - Common knots: water knot (webbing), square knot, double fisherman's bend
 - Animation showing slippage risk with incorrect joining
 - Tension and safety implications for different joining knots
- **Gripping Knots (ELO5)**
 - Function: maintain position on a fixed rope without slipping
 - Common knots: prusik hitch, Blake's hitch
 - Use cases in tool support or backup lines
 - Behavior under load and limitations
 - Example: rope-on-rope compatibility
- **Comparing Knot Selection by Task Type**
 - Decision framework: "What does the knot need to do?"
 - Create a loop? Grip a rope? Join rope ends?
 - Interactive activity: match knot to hoisting scenario
 - Visual knot family tree with fireground applications

Module: Ropes and Knots

Block 1: Introduction to Ropes and Knots

Lesson 3: Rope Care and Inspection

(-- minutes)

Learning Objectives

LO8 Clean a utility rope

LO9 Inspect a utility rope

LO10 Place a damaged rope out of service

Enabling Learning Objectives

1. Describe appropriate cleaning methods for utility rope, given a list of contaminants and departmental cleaning guidelines, so that the method selected matches the rope material and level of soiling. (LO8)
2. Identify cleaning tools and products approved for rope care, given manufacturer recommendations and images of available supplies, so that only acceptable cleaning agents and tools are selected. (LO8)
3. List common signs of rope damage, given photos and descriptions of worn or compromised rope, so that visible damage types are named and categorized. (LO9)
4. Explain the criteria for removing a rope from service, given a damaged rope scenario and department policies, so that the conditions for removal are described according to policy. (LO10)
5. Describe the documentation process for damaged rope, given a sample inspection form and agency reporting procedures, so that the required information is identified and matched to the correct reporting section. (LO9, LO10)

Content Outline

- **Introduction to Rope Maintenance Responsibilities**
 - Connection to firefighter readiness and NFPA standards
 - Consequences of rope failure (safety, cost, liability)
 - Firefighter role in ensuring rope serviceability
- **Rope Cleaning Methods (ELO1)**
 - Overview of cleaning needs: dirt, chemicals, soot, biological contaminants
 - Department policy vs. manufacturer recommendations
 - Approved cleaning methods:
 - Hand washing
 - Rope washer tools
 - Mild soap solutions
 - Situational factors:
 - Level of contamination
 - Rope material and age

Resources

Activities
Materials
Facilities
Notes

Module: Ropes and Knots

Block 1: Introduction to Ropes and Knots

- Environmental exposure
 - Example: salt, fuel
- **Approved Cleaning Tools and Products (ELO2)**
 - Common rope-safe tools:
 - Rope washer
 - Soft-bristle brushes
 - Mesh bags
 - Cleaning agents:
 - pH-neutral soaps
 - Non-residue cleaners
 - Products to avoid:
 - Bleach, harsh detergents, solvents
- **Signs of Rope Damage (ELO3)**
 - Categories of damage:
 - Abrasion, melting, fraying, discoloration, stiffness
 - Internal vs. external damage
 - How to detect hidden issues
 - Visual gallery of damage examples
- **Criteria for Removing a Rope from Service (ELO4)**
 - Departmental serviceability standards
 - NFPA references and typical rejection criteria
 - Core exposure
 - Excessive wear
 - Contamination that cannot be removed
 - How decisions are documented and communicated
- **Documentation and Reporting Procedures (ELO5)**
 - Rope inspection tags/logs
 - Written reports or electronic entries
 - What to record:
 - Inspection date
 - Type of damage
 - Action taken (cleaned, tagged, removed)
 - Sample form walkthrough with interactive fields
 - Chain of communication: reporting to officer

Module: Ropes and Knots

Block 2: Ropes and Knots Lab

Lab 1: Basic Knot Tying

(-- minutes)

Learning Objectives

LO1 Tie basic fire service knots

Enabling Learning Objectives

1. Tie an end-of-line loop, given utility rope and a selected tool to be hoisted, so that the knot is properly dressed, tightened, and suitable for securing the tool. (LO1)
2. Tie a midline loop, given utility rope and a simulated hoisting situation, so that the loop is placed at the correct location and remains stable under tension. (LO1)
3. Secure rope around a tool or object, given utility rope and a hand tool, ladder, or hose line, so that the object is held firmly and the knot can be untied after use. (LO1)
4. Join two ends of rope or webbing together, given two sections of utility rope or webbing, so that the connection supports load-bearing tension and does not slip. (LO1)
5. Tie a gripping knot, given a hoisting line and a section of rope, so that the knot remains in position and maintains grip under load. (LO1)

Content Outline

- **Goal**
 - This lab station is designed to develop hands-on proficiency with essential fire service knots. Students will tie each knot in isolation, using standardized procedures, and will be coached to meet the criteria for safe, effective, and functional knot performance under load. The focus is on building muscle memory, knot confidence, and safe handling of tools and rope.
- **Sequence of Activities**
 - Instructor demonstration of at least one of each knot type with commentary
 - Group walkthrough with guided practice and correction
 - Individual practice and evaluation with coaching
 - Peer review or paired practice as time permits
- **Safety and Management Considerations**
 - Arrange student groups to allow visibility and movement
 - Rotate knots in a set order to keep flow consistent
- **Instructor Demonstration (“I do”)**
 - Demonstrate the following knots with overhead verbalization and visual positioning
 - End-of-line loop (Figure-eight on a bight or bowline)
 - Demonstrate tying, dressing, checking, and loading

Resources

- Activities**
- FA-01 Tie an end-of-line loop
 - FA-02 Tie a midline loop
 - FA-03 Secure a rope around objects
 - FA-04 Join rope or webbing ends together
 - FA-05 Tie a gripping knot
- Materials**
- Facilities**
- Notes**
- Examples of each knot are listed for clarity. It is not intended that students be competent in tying all knots listed. Students should consistently practice and apply the minimum number of knots to successfully complete fireground hoisting tasks.

Module: Ropes and Knots

Block 2: Ropes and Knots Lab

- Show tool secured by loop and explain inspection points
- Midline loop (Figure-eight on a bight or alpine butterfly)
 - Emphasize the need for a centered, load-bearing loop
 - Show correct loop orientation and dressing under tension
- Securing knot (Figure-eight follow-through or clove hitch)
 - Demonstrate wrapping around a tool or anchor
 - Emphasize safety knots and slip prevention
- Joining knot (water knot or square knot with overhand backup)
 - Demonstrate joining webbing and/or rope
 - Show inspection of knot tails and risk of slippage
- Gripping knot (prusik)
 - Demonstrate correct wrapping on hoisting line
 - Show behavior under load and importance of material compatibility
- **Instructor-Led Guided Practice (“We do”)**
 - Conduct step-by-step walkthroughs with all students for each knot
 - Tie slowly with students mirroring you step-by-step
 - Pause at key dressing and tightening steps
 - Circulate and correct hand placement, bite length, and dressing
 - After each knot
 - Conduct group inspection of each student's knot
 - Load test knots where applicable to show real behavior
 - Discuss when to use each knot and what could go wrong
- **Student-Centered Practice (“You do”)**
 - Each student ties each knot three times correctly
 - Final performance must meet all performance criteria
 - secure, dressed, untied after use
 - Independent rotation: students move through stations with a rope and card listing knot steps
 - Partner observation: students take turns tying and inspecting knots for each other
 - Timed practice: introduce basic time limits after technique is solidified
 - Instructor Role

Module: Ropes and Knots

Block 2: Ropes and Knots Lab

- Circulate actively, give targeted feedback
- Use questioning to reinforce decision-making
- Prompt students to inspect their own work for confidence building
- **Instructor Tips**
 - Misidentifying knots: Reinforce naming conventions visually and verbally
 - Poor dressing: Watch for loose loops and overlaps; emphasize inspection
 - Slipping or insecure knots: Emphasize correct tensioning and setting of knots under light load
 - Overreliance on a single knot: Prompt students to match knot type to task, not just tie what's familiar
 - Incorrect tool orientation: For knots involving tools, ensure students check balance and grip

Lab 2: Tool Rigging and Hoisting

(-- minutes)

Learning Objectives

LO6 Select an appropriate knot

LO7 Hoist a tool

Enabling Learning Objectives

Content Outline

- **Goal**
 - This station provides students with hands-on experience selecting the correct knot for a given tool and rigging it for safe hoisting. Students will practice matching knots to tasks, applying knots to tools, and conducting controlled lifts using utility rope. The focus is on making decisions based on tool characteristics, rigging for safety, and demonstrating readiness for fireground tasks.
- **Sequence of Activities**
 - Instructor demonstration of rigging and hoisting a variety of tools
 - Guided practice with group analysis of knot choice and hoisting setup
 - Individual and paired hoisting tasks with real-time coaching and correction
- **Safety and Management Considerations**
 - Maintain clear overhead space for lifting

Resources

Activities

- FA-06 Hoist a tool

Materials

Facilities

Notes

Module: Ropes and Knots

Block 2: Ropes and Knots Lab

- Ensure tools are lightweight training props or padded if dropped
- Monitor for rope burns, tripping hazards, and uncontrolled swings
- Reinforce commands and hand signals to simulate fireground communication
- **Instructor Demonstration (“I do”)**
 - Demonstrate the full sequence using multiple tool types:
 - Tool: Axe
 - Select: figure-eight on a bight or bowline (end-of-line loop)
 - Rig: through handle or head, ensure balance
 - Hoist: maintain control, stop at midpoint to inspect
 - Tool: Pike Pole
 - Select: clove hitch or round turn with two half hitches
 - Rig: near center of mass, secure both ends
 - Hoist: monitor for tipping or rotation
 - Tool: Hose Roll
 - Select: midline loop or secured hitch
 - Rig: ensure wrap holds hose tightly
 - Hoist: demonstrate safe lowering technique
 - Inspection and Safety Checks
 - Load test before hoisting
 - Communication: “Ready to lift,” “Rope clear,” “Lowering”
 - Review anchoring points and backup lines if applicable
- **Instructor-Led Guided Practice (“We do”)**
 - Conduct task walkthroughs for each tool with full group
 - Present tool and scenario
 - Ask students to recommend an appropriate knot
 - Tie knot together and apply to tool as a group
 - Review: balance, tightness, ability to untie after use
 - Hoist tool together under supervision with commentary
 - Emphasize stopping point and load behavior during lift
- **Student-Centered Practice (“You do”)**
 - Assign individual or pair-based hoisting tasks

Module: Ropes and Knots

Block 2: Ropes and Knots Lab

- Students will select the correct knot, rig the tool, perform hoist
 - Tools: axe, Halligan, saw, pike pole, hose roll
 - Students must:
 - Explain their knot choice
 - Tie the knot and rig tool
 - Hoist with control
- Performance Criteria:
 - Tool is rigged securely and does not shift during lift
 - Knot is appropriate to tool shape, size, and purpose
 - Hoisting is performed with smooth, steady control
 - Load is lowered with equal attention to control and safety
- Instructor Role:
 - Circulate and evaluate rigging quality and decision-making
 - Prompt corrections in knot choice or application
 - Check understanding
- Instructor Tips
 - Incorrect knot for tool shape: Emphasize matching knot to tool type (round handle vs. flat head)
 - Unbalanced rigging: Demonstrate tool tipping and how to correct it
 - Insecure dressing: Reinforce need for tight, properly dressed knots before lifting
 - Poor rope management: Watch for stepping on or tangling rope
 - Skipping safety commands: Insist on using “Ready to hoist,” “Clear,” “Lowering” with each repetition

Module: Ropes and Knots

Block 2: Ropes and Knots Lab

Lab 3: Rope Inspection and Maintenance

(-- minutes)

Learning Objectives

- LO8** Clean a utility rope
- LO9** Inspect a utility rope
- LO10** Place a damaged rope out of service

Enabling Learning Objectives

1. Clean a utility rope, given a soiled rope, department-approved cleaning supplies, and a designated cleaning area, so that the rope is free of debris and cleaned in accordance with manufacturer and agency guidelines. (LO8)
2. Inspect a utility rope, given a training rope, inspection checklist, and adequate lighting, so that signs of wear, damage, or contamination are identified and documented. (LO9)
3. Tag a damaged utility rope for removal from service, given a rope that does not meet service standards and department marking supplies, so that the rope is labeled according to agency procedure and removed from operational access. (LO10)
4. Document rope inspection findings, given a completed inspection and department reporting forms, so that all required information is recorded legibly and submitted according to agency policy. (LO9, LO10)

Content Outline

- **Goal**
 - This lab allows students to apply previously learned rope care procedures by practicing rope cleaning, conducting visual and tactile inspections, and removing damaged ropes from service. Students will also complete inspection documentation using realistic forms and marking procedures. The focus is on building attention to detail, systematic inspection habits, and professional responsibility for rope integrity.
- **Sequence of Activities**
 - Instructor demonstration of cleaning, inspection, tagging, and documentation
 - Group walkthrough of key procedures
 - Individual or pair-based student practice with feedback
- **Safety and Management Considerations**
 - Ensure all cleaning agents and tools are approved and labeled
 - Monitor for slippery floors during cleaning activities
 - Ensure all damaged ropes used for inspection are clearly marked as non-serviceable

Resources

- Activities**
 - FA-07 Clean and maintain rope
- Materials**
- Facilities**
- Notes**

Module: Ropes and Knots

Block 2: Ropes and Knots Lab

- Encourage students to slow down and document findings carefully
- **Instructor Demonstration (“I do”)**
 - Demonstrate the complete rope care sequence using a department training rope:
 - Rope Cleaning Procedure
 - Show rope covered in dirt/soot/contaminant (simulated if needed)
 - Review approved cleaning agents and tools
 - Demonstrate hand wash method or use of rope washer
 - Emphasize drying, storage, and documentation
 - Rope Inspection
 - Use a clean, dry rope for inspection
 - Explain the systematic inspection process:
 - Sight (visual): discoloration, fuzzing, cuts
 - Touch (tactile): stiffness, soft spots, flat areas
 - Smell (chemical exposure)
 - Demonstrate marking of findings on checklist
 - Tagging and Removal from Service
 - Demonstrate use of colored tags, zip ties, or flagging tape
 - Show where to attach tag
 - Explain log entry and storage/removal procedure
 - Documentation
 - Fill out a sample inspection form
 - Explain who receives the form and how it is filed
- **Instructor-Led Guided Practice (“We do”)**
 - Work through one full inspection cycle together:
 - Assign a rope to each group
 - Walk through visual and tactile inspection as a class
 - Guide students in using the checklist
 - Ask questions: “What would you flag here?”, “Is this damage significant?”
 - Clean the rope together using department-approved supplies
 - Practice filling out a sample inspection form for group discussion
 - Discuss whether rope should be returned to service or removed
- **Student-Centered Practice (“You do”)**
 - Assign each student or pair the following tasks:
 - Clean a Utility Rope

Module: Ropes and Knots

Block 2: Ropes and Knots Lab

- Select and use appropriate cleaning tools and supplies
 - Follow procedure for cleaning, drying, and storing
- Inspect a Utility Rope
 - Use inspection checklist and appropriate lighting
 - Identify any visible or tactile signs of damage
 - Mark or describe damage on the checklist
- Tag and Remove a Rope from Service
 - If damage is present, apply proper tag or label
 - Follow correct removal procedure (bagging, tagging, report)
- Document Findings
 - Complete an inspection form
 - Submit form to instructor or place in designated area
- Performance Criteria:
 - Cleaning is completed using approved methods and tools
 - Rope is free of debris and contaminants
 - Damage, if found, is correctly identified and recorded
 - Tagging is applied per department procedure
 - Documentation is complete, legible, and submitted correctly
- **Instructor Tips (Common Errors and Misconceptions)**
 - Overlooking internal damage: Remind students to flex the rope and feel for soft spots or inconsistencies
 - Using unapproved cleaning products: Reinforce department policy and why harsh cleaners degrade rope integrity
 - Inadequate drying procedures: Emphasize air drying in shaded, well-ventilated areas
 - Tagging the wrong location or using non-standard methods: Demonstrate clearly where and how to tag
 - Incomplete documentation: Encourage a double-check before submission, and reinforce documentation as part of public trust

NFPA 1410

11.6 Hoisting Tools and Appliances.

11.6.1 The ability of company members to tie the representative knots, bends, or hitches for the following purposes shall be evaluated:

- (1) End-of-line loop
- (2) Midline loop
- (3) Securing rope around desired objects
- (4) Joining rope or webbing ends together
- (5) Gripping rope

11.6.2 The evaluator shall select a minimum of two hoisting evolutions.

11.6.3 The evolution shall begin when the evaluator initiates the evaluation and conclude when the evaluator is satisfied that the knot or hitch has been tied correctly and the tools or appliance have been hoisted a minimum of 14 ft (5 m).