Rope Rescue Awareness/Operations (2017)

Course Plan

Course Details

CTS Guide: Rope Rescue Awareness/Operations

Description: This course provides information on low-angle and high-angle rescue, familiarizing participants with operation of simple, complex, and compound rope rescue systems in the low- and high-angle environment.

Designed For: All fire service and allied emergency response personnel

Prerequisites: Precourse work (online)
IS-100: Introduction to the Incident Command System
IS-200: ICS for Single Resources and Initial Action Incidents
IS-700: National Incident Management System, An Introduction
IS-800: National Response Framework, An Introduction

Standard: Attend entire course. Complete all activities and any formative tests. Complete all summative tests with a minimum score of 80%.

Hours: Lecture: 12:15

Activities: 26:45

Testing: 1:00

Hours (Total): 40:00

Maximum Class Size: 24

Instructor Level: Primary

Instructor/Student Ratio: 24:1 lecture, 12:1 low-angle activities, 6:1 high-angle activities

Restrictions: Training site meets site requirements and equipment standards

SFT Designation: FSTEP

Required Resources

Instructor Resources

To teach this course, instructors need one or more of the following:

- Rope Rescue Manual, current edition, CMC Rescue, Inc., ISBN: 978-009845878-5 (applies to 2017 edition) (available as hard copy, online, or as an app)
- The Essential Technical Rescue Field Operations Guide (DRR), current edition, by Tom Pendley, Desert Rescue Research, ISBN: 978-0-692-90153-3 (applies to 2017 edition) (available as hard copy, and app, or online)
- Fundamentals of Technical Rescue, Jones and Bartlett, current edition, ISBN: 978-0-7637-3837-2 (applies to 2010 edition)
- Fire Service Technical Search and Rescue, current edition, International Fire Service Training Association, ISBN: 978-087939580-3 (applies to 2015 edition)

To teach this course, instructors may use the following:

- Fundamentals of Technical Rescue Toolkit, Jones and Bartlett, current edition, ISBN: 978-0763776954 (applies to 2011 edition)

Online Instructor Resources

The following instructor resources are available online at https://osfm.fire.ca.gov/divisions/state-fire-training/fstep-curriculum/:

- Operational checklist
- California Code of Regulations, Title 8, Section 1670 Personal Fall Protection (dir.ca.gov)
- California Code of Regulations, Title 8, Section 3270.1 Use of Rope Access Equipment (dir.ca.gov)

Student Resources

To participate in this course, students need:

- Any textbooks selected by the instructor
- Helmet, gloves, eye protection, and any other safety equipment required by the AHJ
- Student materials such as paper, pens, pencils

To participate in this course, students may need:

- Knee pads

Facilities and Equipment

The following facilities and equipment are required to deliver this course:

- Side openings to accommodate simultaneous operations of ladder systems.
- High and low anchor points appropriately placed for use with each operation

- Open field area to accommodate simultaneous operations, ladder "A" frame, ladder gin, and pickets
- Area to lower a student one story through an opening using an interior leaning ladder (minimum 8 feet)
- Structure, 30 feet minimum height with working roof that is of sound and safe engineering design
- Topside working area, 50 feet long x 12 feet wide with a connected slope area, minimum 30 feet long x 10 feet wide at a 30–60° angle; area supports two (2) squads or maximum of twenty-four (24) students
- Area to demonstrate and practice skills (rescue knots, rescue/victim packaging, anchors, and rope systems)
- Open field sloping area
- All high angle evolutions performed in an environment in which the load is predominately supported by the rope rescue system
- A minimum vertical distance of 10 to 20 feet
- A minimum required ascending distance of 10 to 20 feet
- An obstacle to negotiate while ascending and descending
- An obstacle to negotiate during lowering and raising operations

Equipment List:
Note: All equipment must be NFPA compliant or purpose-designed (i.e., prusiks).

Item	Size Description	Number	Notes
Anchor plate		6	
Apparatus, fire (large)	Large	Optional	
Backboard, long		Optional	
Descent control device used by the AHJ		8	
Carabiner (locking)		80	
Commercial Class III harness (variety of sizes)	Small	12	
Commercial victim seat harness		2	
Commercial victim chest harness		2	
Cord	8mm x 33'	Optional	
Edge protection		Enough	Edge protection can be manufactured (rope rollers, etc) or improvised (split fire hose, etc). There shall be adequate amounts of edge protection available for concurrent running scenarios.

Edge roller		Enough	
Ascenders		4	While Gibbs Ascenders™ are acceptable, handled ascenders are preferred.
Ladder 24'		Enough	
Ladder 14'		Enough	
Litter tender straps		Optional	
Litter wheel		Optional	
Load-releasing device		6	Commercial or field assembled (with webbing or cordelette) complete with General Use carabiners. These carabiners are in addition to the amounts specified under the carabiner and prusik categories.
Kernmantle rope	150'	6	
Kernmantle rope	20’	4	
Picket, steel	1"x4'	12	
Prusik loop	Short	20	
Prusik loop	Long	20	
Pulley: standard	2" or 4"	8	
Pulley: prusik minding	2" or 4"	8	All 16 can be prusik minding
Pulley: double	2" or 4"	2	
Pulley: knot passing		1	
Rescue litter		2	
Rescue litter pre-rig with 4 prusiks and 6 carabiners		2	Commercial or field assembled complete with general use carabiners and prusiks; if field assembled these carabiners and prusiks are in addition to the amounts specified under the carabiner and prusik categories.
Rescue mannequin		Optional	
Sledgehammer	8–10 lb.	2	
Spider straps		Optional	
Tie rope	15'	24	
Webbing, blue tubular	1"x15'	24	
Webbing, green tubular	1"x5'	12	
Webbing, orange tubular	1"x20'	24	

Webbing, yellow tubular	1"x12'	12	
Pick off strap		2	
Etriers		2	Can be commercial or field assembled from one inch tubular webbing.
Mini MA system		Optional	
Swivels		Optional	

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic, a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives

1. Identify facility requirements
    - Restroom locations
    - Food locations
    - Smoking locations
    - Emergency procedures
2. Identify classroom requirements
    - Start and end times
    - Breaks
    - Electronic device policies
    - Special needs and accommodations
    - Other requirements as applicable
3. Review course syllabus
    - Course objectives
    - Calendar of events
    - Course requirements
    - Student evaluation process
    - Assignments
    - Activities
    - Required student resources
    - Class participation requirements

Discussion Questions

1. What is a formative test? What is a summative test?

Activities

1. To be determined by the instructor.

Topic 1-2: Rescue Technician Certification Process

Terminal Learning Objective

At the end of this topic, a student will be able to identify different levels in the Rescue Technician certification track, the courses and requirements for [Level #] certification, and be able to describe the capstone task book and testing process.

Enabling Learning Objectives

1. Identify the different levels of certification in the Rescue Technician certification track
    - Rope Rescue Operations
    - Rope Rescue Technician

- Structural Collapse Specialist I
- Structural Collapse Specialist II

2. Identify the courses required for Rope Rescue Operations
   - Rope Rescue Operations
   - ICS-100: Introduction to the Incident Command System
   - ICS-200: ICS for Single Resources and Initial Action Incidents
   - IS-700: National Incident Management System, An Introduction
   - IS-800: National Response Framework, An Introduction
3. Identify any other requirements for Rope Rescue Operations
4. Describe the capstone task book process
   - Complete all prerequisites and course work
   - Submit application and fees to request capstone task book
   - Complete all job performance requirements included in the task book
   - Must have identified evaluator verify individual task completion via signature
   - Must have Fire Chief or authorized representative verify task book completion via signature
   - Must be employed by a California Fire Agency in the position prior to submitting completed task book to State Fire Training
5. Describe the capstone testing process
   - Complete course work
   - Schedule online capstone test
   - Schedule skills evaluation test

Discussion Questions

1. How many levels are there in the Rescue Technician certification track? What are they?

Activities

1. To be determined by the instructor.

Unit 2: Rope Rescue Awareness

Topic 2-1: Recognizing the Need for Support Resources

Terminal Learning Objective

At the end of this topic, given a specific type of rescue incident, the student will be able to recognize the need for support resources, so that a resource cache is managed, scene lighting is provided for the tasks to be undertaken, environmental concerns are managed, personnel rehabilitation is facilitated, and the support operation facilitates rescue operational objectives.

Enabling Learning Objectives

1. Identify equipment organization and tracking methods
2. Identify lighting resource type(s)
3. Identify shelter and thermal control options
4. Identify rehab criteria

5. Track equipment inventory
6. Identify lighting resources and structures for shelter and thermal protection
7. Identify rehab areas
8. Describe managing personnel rotations

Discussion Questions

9. What support resources are available in your AHJ?
10. What is your AHJ's rehab policy?

Activities

1. To be determined by the instructor.

Instructor Notes

1. The instructor may choose to present the awareness-level material (Unit 2) as precourse work.

CTS Guide Reference: CTS 1-1

Topic 2-2: Recognizing Incident Hazards and Initiating Isolation Procedures

Terminal Learning Objective

At the end of this topic, given scene control barriers, personal protective equipment (PPE), requisite equipment, and available specialized resources, the student will be able to recognize incident hazards and initiate isolation procedures, so that all hazards are identified, resource application fits the operational requirements, hazard isolation is considered, risks to rescuers and victims are minimized, and rescue time constraints are taken into account.

Enabling Learning Objectives

1. Identify resource capabilities and limitations
2. Describe types and nature of incident hazards
3. Describe equipment types and their use
4. Describe isolation terminology, methods, equipment, and implementation
5. Identify operational requirement concerns
6. Describe common types of rescuer and victim risk
7. Describe risk/benefit analysis methods and practices
8. Identify types of technical references
9. Identify resource capabilities and limitations
10. Identify incident hazards
11. Describe how to assess victim viability (risk/benefit)
12. Describe technical references
13. Place scene control barriers
14. Operate control and mitigation equipment

Discussion Questions

1. What electronic references do you use in your AHJ?
2. What are common hazards found in your environment?
3. What national and state typed resources do you have in and around your AHJ?

4. What are your limitations operating at the awareness level?

Activities

1. To be determined by the instructor.

Instructor Notes

1. National and state typed resources might include NIMS and FIRESCOPE.

CTS Guide Reference: CTS 1-2

Topic 2-3: Recognizing Needed Resources for a Rescue Incident

Terminal Learning Objective

At the end of this topic, given incident information, a means of communication, resources, tactical worksheets, personnel accountability protocol, applicable references, and standard operating procedures, the student will be able to recognize needed resources for a rescue incident, so that references are utilized, personnel are accounted for, necessary resources are deployed to achieve desired objectives, incident actions are documented, rescue efforts are coordinated, the command structure is established, task assignments are communicated and monitored, and actions are consistent with applicable regulations.

Enabling Learning Objectives

1. Describe incident management system
2. Describe tactical worksheet application and purposes
3. Describe accountability protocols
4. Describe resource types and deployment methods
5. Describe documentation methods and requirements
6. Describe availability, capabilities, and limitations of rescuers and other resources
7. Identify communication problems and needs
8. Identify communications requirements, methods, and means
9. Describe types of tasks and assignment responsibilities
10. Describe policies and procedures of the agency
11. Identify technical references related to the type of rescue incident
12. Describe the implementation of an incident management system
13. Describe how to complete tactical worksheets
14. Evaluate incident information
15. Match resources to operational needs
16. Operate communications equipment
17. Describe the management of incident communications
18. Communicate in a manner so that objectives are met

Discussion Questions

1. What are the applicable regulations?
2. What information should be included on a tactical worksheet?
3. What are some kinds of communication equipment used in your AHJ?

Activities

1. Instructor must create an activity directing students to fill out the AHJ's tactical worksheet.

Instructor Notes

1. This activity can be done at a different point in the course.
2. The activity will help reinforce the personnel accountability process and resource tracking.

CTS Guide Reference: CTS 1-3

Topic 2-4: Initiating a Discipline-Specific Search

Terminal Learning Objective

At the end of this topic, given hazard-specific PPE, equipment pertinent to search mission, an incident location, and victim investigative information, the student will be able to initiate a discipline-specific search, so that search parameters are established, the victim profile is established, the entry and exit of all people either involved in the search or already within the search area are questioned and the information is updated and relayed to command, the personnel assignments match their expertise, all victims are located as quickly as possible, applicable technical rescue concerns are managed, risks to searchers are minimized, and all searchers are accounted for.

Enabling Learning Objectives

1. Describe local policies and procedures
2. Describe how to operate in the site-specific search environment
3. Determine the potential for entering, maneuvering in, and exiting the search environment
4. Provide for and perform self-escape/self-rescue

Discussion Questions

1. What questions would you ask an on-scene witnesses and reporting parties?
2. What equipment is pertinent to the search mission?
3. What types of PPE might be applicable to different types of hazards?
4. What are the components of the nationally recognized search marking system?

Activities

1. To be determined by instructor

Instructor Notes

1. None

CTS Guide Reference: CTS 1-4

Topic 2-5: Performing Ground Support Operations for Helicopter Activities

Terminal Learning Objective

At the end of this topic, given a rescue scenario/incident, helicopter, operational plans, PPE, requisite equipment, and available specialized resources, the student will be able to perform ground support operations for helicopter activities, so that rescue personnel are aware of the operational characteristics of the aircraft and demonstrate operational proficiency in establishing and securing landing zones and communicating with aircraft personnel until the assignment is complete.

Enabling Learning Objectives

1. Identify ground support operations relating to helicopter use and deployment
2. Identify operation plans for helicopter service activities
3. Describe type-specific PPE
4. Describe aircraft familiarization and hazard areas specific to helicopters
5. Describe scene control and landing zone requirements
6. Identify aircraft safety systems
7. Describe communications protocols
8. Provide ground support operations
9. Review standard operating procedures for helicopter operations
10. Use PPE
11. Establish and control landing zones
12. Communicate with aircrews

Discussion Questions

1. What are the hazard areas for different types of helicopters?
2. What helicopter resources are available in your AHJ?
3. What are the landing zone requirements for different helicopter types?
4. How do you communicate with aircrews on the ground and in the air?

Activities

1. To be determined by instructor

Instructor Notes

1. The instructor should refer to the current version of the IRPG.

CTS Guide Reference: CTS 1-5

Topic 2-6: Initiating Triage of Victims

Terminal Learning Objective

At the end of this topic, given triage tags and local protocol, the student will be able to initiate triage of victims, so that rescue versus recovery factors are assessed, triage decisions reflect resource capabilities, severity of injuries is determined, and victim care and rescue priorities are established in accordance with local protocol.

Enabling Learning Objectives

1. Describe types and systems of triage according to local protocol
2. Identify resource availability
3. Identify methods to determine injury severity
4. Describe ways to manage resources
5. Describe prioritization requirements
6. Use triage materials, techniques, and resources
7. Categorize victims correctly

Discussion Questions

1. What are the resources available to perform triage?
2. Do you have a standard for triage in your AHJ?

Activities

1. To be determined by the instructor

Instructor Notes

1. None

CTS Guide Reference: CTS 1-6

Topic 2-7: Assisting a Team in Operation of the Haul Line

Terminal Learning Objective

At the end of this topic, given rescue personnel, an established rope rescue system, a load to be moved, and an anchor system, the student will be able to assist a team in operation of the haul line of a rope mechanical advantage system raising operation, so that the movement is controlled; a reset is accomplished; the load can be held in place when needed; commands are followed in direction of the operation; and potential problems are identified, communicated, and managed.

Enabling Learning Objectives

1. Describe principles of mechanical advantage
2. Describe operation of a haul line in a raising operation
3. Identify personnel assignments
4. Describe operational commands
5. Follow operational commands
6. Identify safety concerns during raising operations

Discussion Questions

1. What are your roles and responsibilities as a awareness level member?

Activities

1. To be determined by the instructor

Instructor Notes

1. None

CTS Guide Reference: CTS 1-7

Unit 3: Rope Rescue Operations

Terminal Learning Objective

At the end of this topic, given background information and applicable reference materials, the student will be able to perform size up of a rescue incident, so that the type of rescue is determined, the number of victims is identified, the last reported location of all victims is established, witnesses and reporting parties are identified and interviewed, resource needs are assessed, search parameters are identified, and information required to develop an incident action plan is obtained.

Enabling Learning Objectives

1. Assess types of reference materials and their uses
2. Describe availability and capability of the resources
3. Describe elements of an action plan and related information
4. Describe relationship of size-up to the incident management system
5. Describe information-gathering techniques and how that information is used in the size-up process
6. Explain technical rescue reference materials
7. Describe search parameters
8. Use information-gathering sources

Discussion Questions

1. What are some applicable reference materials?
2. What are the components of an IAP?
3. What are common search techniques?

Activities

1. To be determined by the instructor.

Instructor Notes

1. The instructor must review a Training Action Plan (TAP) and walk the students through the components.

CTS Guide Reference: CTS 2-1

Topic 3-2 Inspecting and Maintaining PPE

Terminal Learning Objective

At the end of this topic, given clothing or equipment for the protection of the rescuers, cleaning and sanitation supplies, maintenance logs or records, and such tools and resources as are indicated by the manufacturer's guidelines for assembly or disassembly of components during repair or maintenance, the students will be able to inspect and maintain hazard-specific PPE so that damage, defects, and wear are identified and reported or repaired, equipment functions as designed, and preventive maintenance has been performed and documented consistent with the manufacturer's recommendations.

Enabling Learning Objectives

1. Describe functions, construction, and operation of PPE

2. Describe use of record keeping systems of the AHJ
3. Describe requirements and procedures for cleaning, sanitizing, and infectious disease control
4. Describe maintenance procedures and use of provided assembly and disassembly tools
5. Describe manufacturer and department recommendations
6. Describe preuse inspection procedures
7. Describe ways to determine operational readiness.
8. Identify wear and damage indicators for PPE
9. Evaluate operational readiness of PPE
10. Complete logs and records
11. Use cleaning equipment, supplies, and reference materials
12. Select and use tools specific to the task

Discussion Questions

1. What are your AHJ's PPE inspection guidelines?
2. What type of equipment logs do you use?
3. Where are your AHJ's maintenance logs and records kept?

Activities

1. Have students make an equipment inspection and fill out an inspection log.

Instructor Notes

1. Show an example of a equipment log.

CTS Guide Reference: CTS 2-2

Topic 3-3 Inspecting and Maintaining Rescue Equipment

Terminal Learning Objective

At the end of this topic, given maintenance logs and records, tools, and resources as indicated by the manufacturer's guidelines, equipment replacement protocol, and organizational standard operating procedure, the student will be able to inspect and maintain rescue equipment, so that the operational status of equipment is verified and documented, all components are checked for operation, deficiencies are repaired or reported as indicated by standard operating procedure, and items subject to replacement protocol are correctly disposed of and changed.

Enabling Learning Objectives

1. Describe functions and operations of rescue equipment
2. Describe selection and use of maintenance tools
3. Describe replacement protocol and procedures
4. Describe criteria for placing equipment out of service
5. Describe organizational standard operating procedures
6. Identify wear and damage indicators for rescue equipment
7. Evaluate operation readiness of equipment
8. Complete logs and records
9. Describe use of recordkeeping systems
10. Describe manufacturer and organizational care and maintenance requirements

Discussion Questions

1. What are retirement or replacement criteria?
2. What does your AHJ use for proper cleaning of the equipment?
3. What are your AHJ's preuse inspection procedures?

Activities

1. To be determined by the instructor.

Instructor Notes

1. Consider showing equipment with normal and excessive wear and out-of-service equipment.

CTS Guide Reference: CTS 2-3

Topic 3-4 Demonstrating Knots, Bends, and Hitches

Terminal Learning Objective

At the end of this topic, given ropes, webbing, and a list of knots used by the agency, the students will be able to demonstrate knots, bends, and hitches, so that the knots are dressed, recognizable, and backed up as required.

Enabling Learning Objectives

1. Describe knot efficiency
2. Describe knot utilization
3. Describe rope construction
4. Identify rope terminology
5. Tie representative knots, bends, and hitches for the following purposes:
   - End-of-line loop
   - Midline loop
   - Securing rope around desired objects
   - Joining rope or webbing ends together
   - Gripping rope

Discussion Questions

1. What is the difference between a knot, a bend, and a hitch?
2. What are the names of the parts of a rope?

Activities

1. The instructor must create an activity directing students to tie all of the knots, bends, and hitches listed in the instructor notes.

Instructor Notes

CTS Guide Reference: CTS 2-4

Topic 3-5 Constructing a Single-Point Anchor System

Terminal Learning Objective

At the end of this topic, given life safety rope and other auxiliary rope rescue equipment, the student will be able to construct a single-point anchor system, so that the chosen anchor system fits the incident needs, meets or exceeds the expected load, and does not interfere with rescue operations; an efficient anchor point is chosen; the need for redundant anchor

points is assessed and used as required; the anchor system is inspected and loaded prior to being placed into service; and the integrity of the system is maintained throughout the operation.

Enabling Learning Objectives

1. Describe application of knots
2. Describe rigging systems and principles
3. Describe system safety check procedures
4. Describe rope and webbing construction
5. Describe rope rescue equipment applications and limitations
6. Select equipment
7. Tie knots, bends, and hitches as required by the AHJ
8. Evaluate anchor points for required strength, location, and surface contour
9. Perform a system safety check

Discussion Questions

1. What criteria are we looking for when considering anchor selection?
2. What are the differences in the regulations between fall restraint versus fall protection?

Activities

1. The instructor must create an activity directing students to construct a single-point anchor system and determine or estimate the expected load.

Instructor Notes

1. Reference: California Code of Regulations, Title 8, Section 1670 Personal Fall Protection
2. Reference: California Code of Regulations, Title 8, Section 3270.1 Use of Rope Access Equipment
3. The instructor must cover pickets.

CTS Guide Reference: CTS 2-5

Topic 3-6: Constructing a Multiple-Point Anchor System

Terminal Learning Objective

At the end of this topic, given life safety rope and other auxiliary rope rescue equipment, the student will be able to construct a multiple-point anchor system, so that the chosen anchor system fits the incident needs, the system strength meets or exceeds the expected load and does not interfere with rescue operations, equipment is visually inspected prior to being put in service, the nearest anchor point that will support the load is chosen, the anchor system is system safety checked prior to being placed into service, the integrity of the system is maintained throughout the operation, and weight will be distributed between more than one anchor point.

Enabling Learning Objectives

1. Describe the relationship of angles to forces created in the rigging of multiple-point anchor systems
2. Describe safety issues in choosing anchor points

3. Describe system safety check methods that allow for visual and physical assessment of system components
4. Describe methods to evaluate the system during operations
5. Describe integrity concerns
6. Describe weight distribution issues and methods
7. Describe knots, bends, and hitches and their applications
8. Describe selection and inspection criteria for hardware and software
9. Describe formulas needed to calculate safety factors for load distribution
10. Describe concepts of static loads versus dynamic loads
11. Determine incident needs as related to choosing anchor systems
12. Select effective knots
13. Determine expected loads
14. Evaluate incident operations as related to interference concerns and setup
15. Choose anchor points
16. Perform a system safety check
17. Evaluate system components for compromised integrity

Discussion Questions

1. What criteria are we looking for when considering anchor selection?
2. What impact do the angles have on the forces created?

Activities

1. The instructor should create an activity directing students to construct a multiple-point anchor system.

Instructor Notes

1. The instructor must discuss how these tasks will be performed in a variety of environments, including environments with less equipment (e.g., rapid extraction module support [REMS]).
2. Reference: California Code of Regulations, Title 8, Section 1670 Personal Fall Protection
3. Reference: California Code of Regulations, Title 8, Section 3270.1 Use of Rope Access Equipment

CTS Guide Reference: CTS 2-6

Topic 3-7: Conducting a System Safety Check

Terminal Learning Objective

At the end of this topic, given a rope-rescue system and rescue personnel, the student will be able to conduct a system safety check, so that a physical/visual check of the system is made to ensure proper rigging, a load test is performed prior to life-loading the system, and verbal confirmation of these actions is announced and acknowledged before life-loading the rope-rescue system.

Enabling Learning Objectives

1. Describe system safety check procedures

2. Explain construction and operation of rope rescue systems and their individual components
3. Describe equipment inspection criteria
4. Identify signs of equipment damage
5. Describe principles of rigging
6. Describe equipment replacement criteria
7. Apply and use PPE
8. Inspect rope rescue system components for damage
9. Assess a rope rescue system for configuration
10. Secure equipment components
11. Inspect all rigging
12. Perform a system safety check

Discussion Questions

1. What are the key components of a system safety check?
2. Who does your AHJ recognize as authorized to perform a system safety check?

Activities

1. The instructor must create an activity directing students to conduct a system safety check.

Instructor Notes

1. The instructor must use an operational checklist, including one specific to the AHJ, covering at a minimum the items on the checklist provided in the instructor resources for training exercises.
2. The instructor may choose to combine constructing, operating, and performing a safety check on a system in one activity.

CTS Guide Reference: CTS 2-7

Topic 3-8: Placing Edge Protection

Terminal Learning Objective

At the end of this topic, given life safety rope or webbing traversing a sharp or abrasive edge, edge protection, and other auxiliary rope rescue equipment, the students will be able to place edge protection, so that the rope or webbing is protected from abrasion or cutting, the rescuer is safe from falling while placing the edge protection, the edge protection is secure, and the rope or webbing is securely placed on the edge protection.

Enabling Learning Objectives

1. Explain materials and devices that can be used to protect ropes or webbing from sharp or abrasive edges
2. Describe fall prevention or protection measures
3. Identify dangers associated with sharp or abrasive edges
4. Describe methods for negotiation of sharp or abrasive edges
5. Select protective devices for rope and webbing
6. Provide personnel fall prevention or protection while working near edges

7. Secure edge protection
8. Secure ropes or webbing in a specific location

Discussion Questions

1. What are the different types of edge protection available in your AHJ?
2. What methods does your AHJ use to secure edge protection?
3. What hazards are associated with not using edge protection?

Activities

1. To be determined by the instructor.

Instructor Notes

1. The instructor must address both the low-angle and high-angle environment.
2. The instructor must bring in different types of edge protection to show the students.
3. The instructor can create a standalone activity or build edge protection into a system.

CTS Guide Reference: CTS 2-8

Topic 3-9: Constructing a Belay System

Terminal Learning Objective

At the end of this topic, given life safety rope, anchor systems, PPE, and rope rescue equipment, the student will be able to construct a belay system, so that the system is capable of arresting a fall, a fall will not result in system failure, the system is not loaded unless actuated, actuation of the system will not injure or otherwise incapacitate the belayer, the belayer is not rigged into the equipment components of the system, and the system is suitable to the site and is connected to an anchor system and the load.

Enabling Learning Objectives

1. Describe principles of belay systems
2. Describe capabilities and limitations of various belay devices
3. Describe application of knots, bends, and hitches; rigging principles; and system safety check procedures
4. Construct a belay system
5. Tie knots, bends, and hitches
6. Perform rigging
7. Don and use task-specific PPE
8. Perform a system safety check

Discussion Questions

1. What are the differences between a slack (e.g., tandem prusik) belay and a tensioned (e.g., TTRS) belay?
2. What are some examples of belays used in your AHJ?

Activities

1. The instructor must create an activity directing students to construct a slack (e.g., tandem prusik) belay or a tensioned (e.g., TTRS) belay.

Instructor Notes

1. The instructor should refer to NFPA 1006 Technical Rescue Personnel Professional Qualifications (2017), A.5.2.9, which discusses two-tension rope systems (TTRS).

CTS Guide Reference: CTS 2-9

Topic 3-10: Operating a Belay System

Terminal Learning Objective

At the end of this topic, given an operating lowering or raising mechanical advantage system, a specified minimum travel distance for the load, a belay system, and a load, the student will be able to operate a belay system during a lowering or raising operation, so that the potential fall factor is minimized, the belay device system is not actuated during operation of the primary rope rescue system, the belay system is prepared for actuation at all times during the operation, the belayer is attentive at all times during the operation, the load's position is continually monitored, and the belayer moves rope through the belay device as designed.

Enabling Learning Objectives

1. Describe application and use of belay devices
2. Describe proper operation of belay systems in conjunction with lowering and raising operations
3. Describe operational commands
4. Operate a belay system
5. Tie approved knots, bends, and hitches
6. Assess system effectiveness
7. Perform a system safety check
8. Communicate belay system status

Discussion Questions

1. What commands does your AHJ use in the operation of a belay system?
2. How do you effectively minimize the fall factor?
3. Why is it important to stay attentive while belaying?

Activities

1. The instructor must create an activity directing students to operate a belay system.

Instructor Notes

1. The instructor must address both the low-angle and high-angle environment.
2. The instructor may choose to combine operating a belay as part of a system into one activity.

CTS Guide Reference: CTS 2-10

Topic 3-11: Belaying a Falling Load

Terminal Learning Objective

At the end of this topic, given a belay system and a dropped load, the student will be able to belay a falling load in a high-angle environment, so that the belay line is not taut until the load is falling, the belay device is actuated when the load falls, the fall is arrested in a manner that minimizes the force transmitted to the load, the belayer utilizes the belay

system as designed, and the belayer is not injured or otherwise incapacitated during actuation of the belay system.

Enabling Learning Objectives

1. Describe application and use of belay devices
2. Describe effective emergency operation of belay devices to arrest falls
3. Describe use of PPE
4. Describe operating procedures
5. Operate a belay system
6. Tie approved knots, bends, and hitches
7. Use task-specific PPE
8. Recognize and arrest a falling load

Discussion Questions

1. What is the proper action in response to a belay line actuation?
2. What are your AHJ's policies for recovering from a line failure?

Activities

1. The instructor must create an activity simulating an unexpected jerk of the belay system as outlined in NFPA 1006, A.5.2.11.

Instructor Notes

1. The instructor may simulate one line of a TTRS failing so that the students transfer the load to the other line.

CTS Guide Reference: CTS 2-11

Topic 3-12: Constructing a Fixed Rope System

Terminal Learning Objective

At the end of this topic, given an anchor system, a life safety rope, and rope rescue equipment, the student will be able to construct a fixed rope system, so that the system constructed can accommodate the load, is efficient, and is connected to an anchor system and the load, and a system safety check is performed and the results meet the incident requirements for descending or ascending operations.

Enabling Learning Objectives

1. Explain rigging principles
2. Select effective knots, bends, and hitches
3. Calculate expected loads
4. Use rigging principles
5. Evaluate interference concerns as related to the incident operations and setup
6. Perform a system safety check
7. Evaluate system components for compromised integrity

Discussion Questions

1. What are your AHJ's protocols for constructing a fixed rope system?
2. What is a contingency anchor?

Activities

1. The instructor must create an activity directing students to construct a fixed rope system using a contingency anchor.

Instructor Notes

1. The instructor must address both the low-angle and high-angle environment.

CTS Guide Reference: CTS 2-12

Topic 3-13: Descending a Fixed Rope

Terminal Learning Objective

At the end of this topic, given an anchored fixed-rope system, a specified minimum travel distance for the rescuer, a system to allow descent of a fixed rope, a belay system, a life safety harness worn by the person descending, and PPE, the student will be able to descend a fixed rope in a low-angle and a high-angle environment, so that the person descending is attached to the fixed rope in a manner that will not allow him or her to fall; the person descending is attached to the rope by means of a descent control device; the speed of descent is controlled; injury to the person descending is minimized; the person descending can stop at any point on the fixed rope and rest suspended by his or her harness; the system will not be stressed to the point of failure; the system is suitable for the site; and the objective is reached.

Enabling Learning Objectives

1. Identify task-specific selection criteria for life safety harnesses and systems for descending a fixed rope
2. Describe PPE selection criteria
3. Describe the design, intended purpose, and operation of descent control devices utilized
4. Describe safe rigging principles and techniques for low- and high-angle environments
5. Identify common hazards posed by harness use
6. Select and use harness, a system for descending a fixed rope, and PPE for common environments
7. Attach the rescuer to the rope rescue system
8. Make attachment of the descent control device to the rope and life safety harness
9. Operate the descent control device
10. Maneuver around existing environment and system-specific obstacles
11. Evaluate surroundings for potential hazards

Discussion Questions

1. What descending system(s) do(es) your AHJ use?
2. What is the difference between an autostop descender and a manual descender?

Activities

1. The instructor must create an activity directing students to descend a minimuim required distance and negotiate obstacles in a low-angle and a high-angle environment.

Instructor Notes

1. The instructor must use contingency anchors on all fixed ropes.

CTS Guide Reference: CTS 2-14

Topic 3-14: Constructing a Lowering System

Terminal Learning Objective

At the end of this topic, given an anchor system, life safety rope(s), a descent control device, and auxiliary rope rescue equipment, the student will be able to construct a lowering system, so that the system can accommodate the load, is efficient, is capable of controlling the descent, is capable of holding the load in place or lowering with minimal effort over the required distance, and is connected to an anchor system and the load.

Enabling Learning Objectives

1. Describe capabilities and limitations of various descent control devices
2. Identify capabilities and limitations of various lowering systems
3. Describe application of knots, bends, and hitches; rigging principles; and system safety check procedures
4. Tie knots, bends, and hitches
5. Perform rigging
6. Attach to descent control device, anchor system, and load
7. Perform a system safety check

Discussion Questions

1. What different descent-control devices are used in your AHJ?
2. What considerations could be made for a raising system?

Activities

1. The instructor must create an activity directing students to construct a lowering system.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-16

Topic 3-15: Operating and Directing a Lowering and a Raising System

Terminal Learning Objective

At the end of this topic, given rescue personnel, an established lowering system, a specified minimum travel distance for the load, and a load to be moved, the student will be able to operate and direct a lowering and a raising system in a low-angle and a high-angle environment, so that the movement is controlled, a knot is passed, the load can be held in place when needed, the system is converted to a raise, operating methods do not stress the system to the point of failure, rope commands are used to direct the operation, and potential problems are identified, communicated, and managed.

Enabling Learning Objectives

1. Describe application and use of descent control devices
2. Describe capabilities and limitations of various lowering systems in a low- and high-angle environment

3. Identify knot, bend, and hitch selection
4. Describe operation of lowering systems in a low- and high-angle environment
5. Describe operation of raising systems in a low- and high-angle environment
6. Identify personnel assignments
7. Identify operational commands
8. Operate a lowering and a raising system
9. Convert a lowering operation to a raising operation
10. Pass a knot in a lowering and a raising operation
11. Use a load-releasing method
12. Direct the operation
13. Use operational commands
14. Analyze system efficiency
15. Manage movement of the load in a low- and high-angle environment
16. Identify safety concerns in a low- and high-angle environment
17. Perform a system safety check

Discussion Questions

1. What are methods for passing a knot?
2. What must be taken into account when performing a lowering or raising operation?

Activities

1. The instructor must create an activity directing students to perform and direct a lowering and raising operation in a low-angle and a high-angle environment.

Instructor Notes

1. The instructor must discuss how these operations will be performed in a variety of environments, including environments with less equipment (e.g., rapid extraction module support[REMS]).

CTS Guide Reference: CTS 2-17

Topic 3-16: Constructing a Simple Rope Mechanical Advantage System

Terminal Learning Objective

At the end of this topic, given life safety rope, carabiners, pulleys, rope grab devices, and auxiliary rope rescue equipment, the student will be able to construct a simple rope mechanical advantage system, so that the system constructed can accommodate the load, is efficient, and is connected to an anchor system and the load.

Enabling Learning Objectives

1. Describe principles of mechanical advantage
2. Identify capabilities and limitations of various simple rope mechanical advantage systems
3. Describe application of knots, bends, and hitches
4. Describe rigging principles
5. Describe system safety check procedures
6. Select rope and equipment

7. Tie knots, bends, and hitches
8. Choose and rig systems
9. Attach the mechanical advantage system to the anchor system and load
10. Perform a system safety check

Discussion Questions

1. Define a simple rope mechanical advantage system.
2. What is a common type of simple rope mechanical advantage system?

Activities

1. The instructor must create an activity directing students to construct a simple rope mechanical advantage system.

Instructor Notes

1. Have the students explain how to quantify a simple rope mechanical advantage system

CTS Guide Reference: CTS 2-18

Topic 3-17: Operating and Directing a Team in Operating a Simple Rope Mechanical Advantage System

Terminal Learning Objective

At the end of this topic, given rescue personnel, an established rope rescue system incorporating a simple rope mechanical advantage system, a specified minimum travel distance for the load, a load to be moved, and an anchor system, the student will be able to operate and direct a team in the operation of a simple rope mechanical advantage system in a low-angle and a high-angle raising operation, so that the movement is controlled, a reset is accomplished, the load can be held in place when needed, operating methods do not stress the system to the point of failure, commands are used to direct the operation, and potential problems are identified, communicated, and managed.

Enabling Learning Objectives

1. Describe principles of mechanical advantage
2. Identify capabilities and limitations of various simple rope mechanical advantage systems and low-angle and high-angle raising operations
3. Describe knot, bend, and hitch selection
4. Describe correct operation of simple rope mechanical advantage systems
5. Identify personnel assignments
6. Identify operational commands
7. Operate the simple rope mechanical advantage system
8. Direct personnel
9. Use operational commands
10. Analyze system efficiency
11. Identify safety concerns
12. Perform a system safety check

Discussion Questions

1. What are the advantages and disadvantages of simple mechanical advantage systems?

2. What are operational commands used for directing simple mechanical advantage system operations?

Activities

1. The instructor must create an activity directing students to operate and direct a team in the operation of a simple rope mechanical advantage system in a low-angle and a high-angle raising operation.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-19

Topic 3-18: Constructing a Compound Rope Mechanical Advantage System

Terminal Learning Objective

At the end of this topic, given a load, an anchor system, life safety rope, carabiners, pulleys, rope grab devices, and rope rescue equipment, the student will be able to construct a compound rope mechanical advantage system, so that the system constructed accommodates the load and reduces the force required to lift the load, operational interference is factored and minimized, the system is efficient, a system safety check is completed, and the system is connected to an anchor system and the load.

Enabling Learning Objectives

1. Describe incident needs as related to choosing compound rope systems
2. Describe elements of efficient design for compound rope systems
3. Describe knot, bend, and hitch selection
4. Describe methods for reducing excessive force to system components
5. Describe evaluation of incident operations as related to interference concerns and setups
6. Describe rope commands
7. Explain rigging principles
8. Identify system safety check procedures
9. Describe methods of evaluating system components for compromised integrity
10. Determine incident needs as related to choosing compound rope systems
11. Tie knots, bends, and hitches
12. Calculate expected loads
13. Evaluate incident operations as related to interference concerns and setups
14. Perform a system safety check
15. Evaluate system components for compromised integrity

Discussion Questions

1. Define a compound rope mechanical advantage system.
2. What is a common type of compound rope mechanical advantage system?

Activities

1. The instructor must create an activity directing students to construct a compound rope mechanical advantage system.

Instructor Notes

1. Have the students explain how to quantify a compound rope mechanical advantage system.

CTS Guide Reference: CTS 2-20

Topic 3-19: Constructing a Complex Rope Mechanical Advantage System

Terminal Learning Objective

At the end of this topic, given a load, an anchor system, life safety rope, carabiners, pulleys, rope grab devices, and rope rescue equipment, the student will be able to construct a complex rope mechanical advantage system, so that the system constructed accommodates the load and reduces the force required to lift the load, operational interference is factored and minimized, the system is efficient, a system safety check is completed, and the system is connected to an anchor system and the load.

Enabling Learning Objectives

1. Describe incident needs as related to choosing complex rope systems
2. Describe elements of efficient design for complex rope systems
3. Describe knot, bend, and hitch selection
4. Describe methods for reducing excessive force to system components
5. Describe evaluation of incident operations as related to interference concerns and setups
6. Describe rope commands
7. Explain rigging principles
8. Identify system safety check procedures
9. Describe methods of evaluating system components for compromised integrity
10. Determine incident needs as related to choosing complex rope systems
11. Tie knots, bends, and hitches
12. Calculate expected loads
13. Evaluate incident operations as related to interference concerns and setups
14. Perform a system safety check
15. Evaluate system components for compromised integrity

Discussion Questions

1. Define a complex rope mechanical advantage system.
2. What is a common type of complex rope mechanical advantage system?

Activities

1. The instructor must create an activity directing students to construct a complex rope mechanical advantage system.

Instructor Notes

1. Have the students explain how to quantify a complex rope mechanical advantage system

CTS Guide Reference: CTS 2-21

Topic 3-20: Operating and Directing the Operation of a Compound Rope Mechanical Advantage System

Terminal Learning Objective

At the end of this topic, given a rope rescue system incorporating a compound rope mechanical advantage system and a load to be moved, and a specified minimum travel distance for the load, the student will be able to operate and direct the operation of a compound rope mechanical advantage system in a low-angle and a high-angle environment, so that a system safety check is performed; a reset is accomplished and the movement is controlled; the load can be held in place when needed; operating methods do not stress the system to the point of failure; operational commands are clearly communicated; and potential problems are identified, communicated, and managed.

Enabling Learning Objectives

1. Identify methods to determine incident needs
2. Describe types of interference concerns
3. Describe rope commands
4. Describe system safety check protocols
5. Describe procedures for continued evaluation of system components for compromised integrity
6. Identify common personnel assignments and duties
7. Describe methods for controlling a load's movement
8. Identify system stress issues during operations
9. Describe management methods for common problems
10. Determine incident needs
11. Evaluate incident operations as related to interference concerns
12. Complete a system safety check
13. Continually evaluate system components for compromised integrity
14. Operate the compound rope mechanical advantage syste
15. Direct personnel
16. Communicate commands
17. Analyze system efficiency
18. Manage load movement
19. Identify concerns

Discussion Questions

1. What are the advantages and disadvantages of compound mechanical advantage systems?
2. What are operational commands used for directing compound mechanical advantage system operations?

Activities

1. The instructor must create an activity directing students to operate and direct a team in the operation of a compound rope mechanical advantage system in a low-angle and a high-angle raising operation.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-22

Topic 3-21: Operating and Directing the Operation of a Complex Rope Mechanical Advantage System

Terminal Learning Objective

At the end of this topic, given a rope rescue system incorporating a complex rope mechanical advantage system and a load to be moved, and a specified minimum travel distance for the load, the student will be able to direct the operation of a complex rope mechanical advantage system in a low-angle and a high-angle environment, so that a system safety check is performed; a reset is accomplished and the movement is controlled; the load can be held in place when needed; operating methods do not stress the system to the point of failure; operational commands are clearly communicated; and potential problems are identified, communicated, and managed.

Enabling Learning Objectives

1. Identify methods to determine incident needs
2. Describe types of interference concerns
3. Describe rope commands
4. Describe system safety check protocols
5. Describe procedures for continued evaluation of system components for compromised integrity
6. Identify common personnel assignments and duties
7. Describe methods for controlling a load's movement
8. Identify system stress issues during operations
9. Describe management methods for common problems
10. Determine incident needs
11. Evaluate incident operations as related to interference concerns
12. Complete a system safety check
13. Continually evaluate system components for compromised integrity
14. Operate a complex rope mechanical advantage system
15. Direct personnel
16. Communicate commands
17. Analyze system efficiency
18. Manage load movement
19. Identify concerns

Discussion Questions

1. What are the advantages and disadvantages of complex mechanical advantage systems?

2. What are operational commands used for directing complex mechanical advantage system operations?

Activities

1. The instructor must create an activity directing students to operate and direct a team in the operation of a complex rope mechanical advantage system in a low-angle and a high-angle raising operation.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-23

Topic 3-22: Negotiating an Edge While Attached to a Rope Rescue System

Terminal Learning Objective

At the end of this topic, given a rope rescue system, a specified minimum travel distance for the rescuer, life safety harnesses, an edge to negotiate during the lower and raise, and specialized equipment necessary for the environment, the student will be able to negotiate an edge while attached to a rope rescue system during a low-angle and a high-angle lowering and raising operation, so that risk to the rescuer is minimized, the means of attachment to the rope rescue system is secure, and all projections and edges are negotiated while minimizing risks to the rescuer or equipment.

Enabling Learning Objectives

1. Describe techniques and practices for negotiating existing projections and edges along the travel path while suspended from operating rope-based lowering and raising mechanical advantage systems and common hazards imposed by those projections and edges
2. Select and use harness and PPE for common environments
3. Attach the rescuer to the rope rescue system
4. Maneuver across existing projections and an edge along the travel path
5. Evaluate surroundings for potential hazards

Discussion Questions

1. What are some ways your AHJ negotiates an edge?
2. What are some different types of edges that may need to be negotiated?

Activities

1. The instructor must create an activity directing students to negotiate an edge while attached to a rope rescue system.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-24

Topic 3-23: Accessing, Assessing, Stabilizing, Packaging, and Transferring Victims

Terminal Learning Objective

At the end of this topic, given diagnostic and packaging equipment and an actual or simulated EMS agency, the student will be able to access, assess, stabilize, package, and transfer victims, so that rescuers and victim are protected from hazards, the victim's injuries or illnesses are managed, and the victim is delivered to the appropriate EMS provider with information regarding the history of the rescue activity and victim's condition.

Enabling Learning Objectives

1. Describe victim and scene assessment methods
2. Explain victim treatment, immobilization, and packaging methods
3. Describe medical information management and communication methods
4. Use victim immobilization, packaging, and treatment methods
5. Provide victim transfer reports, both verbally and in written format

Discussion Questions

1. What packaging equipment and methods does your AHJ use?
2. What information should be passed on to the EMS provider?

Activities

1. The instructor must create an activity directing students to package victims.

Instructor Notes

1. The instructor should cover both ambulatory and nonambulatory victim packaging.
2. The instructor should cover victim packaging for a litter and various other victim packaging devices.

CTS Guide Reference: CTS 2-25

Topic 3-24: Operating and Directing a Litter-Lowering and Litter-Raising System in a Low-Angle Environment

Terminal Learning Objective

At the end of this topic, given rescue personnel, (a) litter tender(s), an established lowering/mechanical advantage system, a specified minimum travel distance for the load, and a victim packaged in a litter to be moved, the student will be able to operate and direct a litter-lowering and litter-raising system in a low-angle environment, so that the litter is attached to the lowering/raising and belay systems; movement is controlled; litter tender(s) are used to manage the litter during the lower and raise; the litter can be held in place when needed; operating methods do not stress the system to the point of failure; rope commands are used to direct the operation; and potential problems are identified, communicated, and managed.

Enabling Learning Objectives

1. Describe the application and use of lowering and mechanical advantage system in the low-angle environment
2. Describe the capabilities and limitations of various lowering and mechanical advantage systems in a low-angle environment
3. Describe litter-tender functions and limitations in the low-angle environment

4. Describe the management of a litter in a low-angle environment during raises and lowers
5. Identify personnel assignments
6. Identify operational commands
7. Operate a litter-lowering and litter-raising system
8. Direct operation
9. Use operational commands
10. Analyze system efficiency
11. Manage movement of the litter in a low-angle environment
12. Identify safety concerns in a low-angle litter operation
13. Perform a system safety check

Discussion Questions

1. What type of litter rig does your AHJ use?
2. What is the configuration for a low-angle litter bridle?

Activities

1. The instructor must create an activity directing students to operate and direct a litter-lowering and litter-raising system in a low-angle environment.

Instructor Notes

1. The instructor must discuss how these operations will be performed in a variety of environments, including environments with less equipment (e.g., rapid extraction module support[REMS]).

CTS Guide Reference: CTS 2-26

Topic 3-25: Operating as a Litter Tender

Terminal Learning Objective

At the end of this topic, given a rope rescue system, a specified minimum travel distance for the litter tender, life safety harnesses, litters, bridles, and specialized equipment necessary for the environment, the student will be able to operate as a litter tender in a low-angle lowering or raising operation, so that risks to victims and rescuers are minimized, the means of attachment to the rope rescue system is secure, and the terrain is negotiated while minimizing risks to equipment or persons.

Enabling Learning Objectives

1. Identify task-specific selection criteria for life safety harnesses
2. Describe PPE selection criteria
3. Describe variations in litter design and intended purpose
4. Describe low-angle litter attachment principles
5. Describe techniques and practices for low-angle environments
6. Identify common hazards imposed by the terrain
7. Select and use harness and PPE for common environments
8. Attach the rescuer to the rope rescue system
9. Maneuver across the terrain

10. Manage the litter while suspended from the rope rescue system
11. Evaluate surroundings for potential hazards

Discussion Questions

1. What are the various methods for attaching litter tenders to the system? Which does your AHJ use?

Activities

1. The instructor must create an activity in which students serve on a three- and a four-person evolution.

Instructor Notes

1. The instructor should reinforce safe lifting techniques, communication, and coordination of a litter team.

CTS Guide Reference: CTS 2-27

Topic 3-26: Directing a Litter-Lowering or Litter-Raising Operation in a High-Angle Environment

Terminal Learning Objective

At the end of this topic, given rescue personnel, an established lowering/mechanical advantage system, a specified minimum travel distance for the load, a victim packaged in a litter to be moved, and a means for negotiating edges and projections along the travel path, the student will be able to direct a litter-lowering or litter-raising operation in a high-angle environment, so that the litter is attached to the lowering/raising and belay systems, an edge is negotiated during a lower and a raise; tag lines are used to manage the litter during the lower and raise; the litter can be held in place when needed; operating methods do not stress the system to the point of failure; rope commands are used to direct the operation; and potential problems are identified, communicated, and managed.

Enabling Learning Objectives

1. Describe application and use of lowering and mechanical advantage system in the high-angle environment
2. Describe capabilities and limitations of various lowering and mechanical advantage systems in a high-angle environment
3. Describe the use of tag lines for management of litter position during high-angle lowers and raises
4. Describe litter positioning options (vertical and horizontal)
5. Identify personnel assignments
6. Identify operational commands
7. Direct operation
8. Use operational commands
9. Analyze system efficiency
10. Manage movement of the litter in a high-angle environment
11. Identify safety concerns in a high-angle environment
12. Perform a system safety check

Discussion Questions

1. What type of litter rig does your AHJ use?
2. What is the configuration for a high-angle litter bridle?
3. What are differences between the high-angle bridle setup and a low-angle bridle setup?

Activities

1. The instructor must create an activity directing students to operate and direct a litter-lowering and litter-raising system in a high-angle environment.

Instructor Notes

1. The instructor must discuss how these operations will be performed in a variety of environments, including environments with less equipment (e.g., rapid extraction module support[REMS]).

CTS Guide Reference: CTS 2-28

Topic 3-27: Selecting, Constructing, and Using Travel Restrictions

Terminal Learning Objective

At the end of this topic, given life-safety rope and other auxiliary rope rescue equipment and an anchor system that meets the incident needs, the student will be able to select, construct, and use travel restriction for rescuers in a low-angle and a high-angle environment, so that the rescuer is restricted from falling.

Enabling Learning Objectives

1. Select an anchor
2. Construct an adjustable travel restriction system
3. Attach a rescuer to a travel restriction system
4. Use travel restriction in a low-angle and a high-angle environment

Discussion Questions

1. What are the considerations for a travel restriction system?
2. What are the components of a travel restriction system?

Activities

1. The instructor must create an activity directing students to select, construct, and use travel restrictions in a low-angle and high-angle environment.

Instructor Notes

1. Reference: California Code of Regulations, Title 8, Section 1670 Personal Fall Protection
2. Reference: California Code of Regulations, Title 8, Section 3270.1 Use of Rope Access Equipment

CTS Guide Reference: CTS 2-29

Topic 3-28: Constructing and Operating Ladder Rescue Systems

Terminal Learning Objective

At the end of this topic, given fire service ladders and rope rescue equipment, the student will be able to construct and operate systems to move patients from a low place to a high

place, a high place to a low place, and across uneven terrain, so that the hazards are mitigated, the obstacles are negotiated, and the risks to the patient are minimized.

Enabling Learning Objectives

1. Describe the components and operational functions of the seven ladder systems
   - Moving ladder slide
   - Ladder slide
   - Exterior leaning ladder
   - Interior leaning ladder
   - Cantilever ladder
   - Ladder gin
   - Ladder A frame
2. Describe the components and operational functions of the mechanical advantage system used in a ladder rescue system
3. Explain safety considerations for ladder rescue systems
4. Construct and operate ladder rescue systems

Discussion Questions

1. What are the different types of fire service ladders?
2. What are hazards associated with ladder rescue systems?

Activities

1. The instructor must create an activity directing students to construct all ladder systems listed in ELO 1 and operate systems to move patients from a low place to a high place, a high place to a low place, and across uneven terrain.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-30

Topic 3-29: Terminating a Technical Rescue Operation

Terminal Learning Objective

At the end of this topic, given an incident scenario, assigned resources, and site safety data, the student will be able to terminate a technical rescue operation, so that rescuer risk and site safety are managed, scene security is maintained and custody transferred to a responsible party, personnel and resources are returned to a state of readiness, recordkeeping and documentation occur, and postevent analysis is conducted.

Enabling Learning Objectives

1. Identify incident command functions and resources
2. Describe hazard identification and risk management strategies
3. Describe logistics and resource management
4. Describe personnel accountability systems
5. Describe AHJ-specific procedures or protocols related to personnel rehab
6. Recognize hazards
7. Analyze risk

8. Use site control equipment and methods
9. Use data collection and management systems
10. Use asset and personnel tracking systems

Discussion Questions

1. What are the considerations for a personnel accountability report (PAR)?
2. What are the components of an after-action review?
3. What are hazards associated with terminating an incident, including equipment breakdown and decontamination?

Activities

1. The instructor must create an activity directing students to conduct a PAR, clean up, and take inventory.

Instructor Notes

1. The instructor should cover all relevant documentation.

CTS Guide Reference: CTS 2-31

Time Table

Segment	Lecture Time	Activity Time	Total Unit Time
Unit 1: Introduction			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
Activity 1-1: To be determined by instructor		0:00	
Topic 1-2: Rescue Technician Certification Process			
Lecture	0:30		
Activity 1-2: To be determined by instructor		0:00	
Unit 1 Totals	**1:00**	**0:00**	**1:00**
Unit 2: Rope Rescue Awareness			
Topic 2-1: Recognizing the Need for Support Resources			
Lecture	0:15		
Activity 2-1: To be determined by instructor		0:00	
Topic 2-2: Recognizing Incident Hazards and Initiating Isolation Procedures			
Lecture	0:15		
Activity 2-2: To be determined by instructor		0:00	
Topic 2-3: Recognizing Needed Resources for a Rescue Incident			
Lecture	0:15		
Activity 2-3: Recognizing Needed Resources for a Rescue Incident		0:15	
Topic 2-4: Initiating a Discipline-Specific Search			
Lecture	0:15		
Activity 2-4: To be determined by instructor		0:00	
Topic 2-5: Performing Ground Support Operations for Helicopter Activities			
Lecture	0:15		
Activity 2-5: To be determined by instructor		0:00	
Topic 2-6: Initiating Triage of Victims			

Segment	Lecture Time	Activity Time	Total Unit Time
Lecture	0:15		
Activity 2-6: To be determined by instructor		0:00	
Topic 2-7: Assisting a Team in Operation of the Haul Line			
Lecture	0:00		
Activity 2-7: To be determined by instructor		0:15	
Unit 2 Totals	**1:30**	**0:30**	**2:00**
Unit 3: Rope Rescue Operations			
Topic 3-1: Sizing Up a Rescue Incident			
Lecture	0:15		
Activity 3-1: To be determined by instructor		0:00	
Topic 3-2: Inspecting and Maintaining PPE			
Lecture	0:15		
Activity 3-2: Inspecting and Maintaining PPE		0:30	
Topic 3-3: Inspecting and Maintaining Rescue Equipment			
Lecture	0:30		
Activity 3-3: To be determined by instructor		0:00	
Topic 3-4: Demonstrating Knots, Bends, and Hitches			
Lecture	0:30		
Activity 3-4: Demonstrating Knots, Bends, and Hitches		1:00	
Topic 3-5: Constructing a Single-Point Anchor System			
Lecture	0:30		
Activity 3-5: Constructing a Single-Point Anchor System		0:30	
Topic 3-6: Constructing a Multiple-Point Anchor System			
Lecture	0:30		
Activity 3-6: Constructing a Multiple-Point Anchor System		0:30	
Topic 3-7: Conducting a System Safety Check			

Segment	Lecture Time	Activity Time	Total Unit Time
Lecture	0:15		
Activity 3-7: Conducting a System Safety Check		0:15	
Topic 3-8: Placing Edge Protection			
Lecture	0:15		
Activity 3-8: To be determined by instructor		0:15	
Topic 3-9: Constructing a Belay System			
Lecture	0:15		
Activity 3-9: Constructing a Belay System		0:45	
Topic 3-10: Operating a Belay System			
Lecture	0:15		
Activity 3-10: Operating a Belay System		1:00	
Topic 3-11: Belaying a Falling Load			
Lecture	0:15		
Activity 3-11: Belaying a Falling Load		0:45	
Topic 3-12: Constructing a Fixed Rope System			
Lecture	0:15		
Activity 3-12: Constructing a Fixed Rope System		0:30	
Topic 3-13: Descending a Fixed Rope			
Lecture	0:15		
Activity 3-13: Descending a Fixed Rope		2:00	
Topic 3-14: Constructing a Lowering System			
Lecture	0:15		
Activity 3-14: Constructing a Lowering System		0:30	
Topic 3-15: Operating and Directing a Lowering and a Raising System			
Lecture	0:15		
Activity 3-15: Operating and Directing a Lowering and a Raising System		1:00	
Topic 3-16: Constructing a Simple Rope Mechanical Advantage System			
Lecture	0:15		

Segment	Lecture Time	Activity Time	Total Unit Time
Activity 3-16: Constructing a Simple Rope Mechanical Advantage System		1:00	
Topic 3-17: Operating and Directing a Team in Operating a Simple Rope Mechanical Advantage System			
Lecture	0:15		
Activity 3-17: Operating and Directing a Team in Operating a Simple Rope Mechanical Advantage System		1:00	
Topic 3-18: Constructing a Compound Rope Mechanical Advantage System			
Lecture	0:15		
Activity 3-18: Constructing a Compound Rope Mechanical Advantage System		0:45	
Topic 3-19: Constructing a Complex Rope Mechanical Advantage System			
Lecture	0:15		
Activity 3-19: Constructing a Complex Rope Mechanical Advantage System		0:45	
Topic 3-20: Operating and Directing the Operation of a Compound Rope Mechanical Advantage System			
Lecture	0:15		
Activity 3-20: Operating and Directing the Operation of a Compound Rope Mechanical Advantage System		0:45	
Topic 3-21: Operating and Directing the Operation of a Complex Rope Mechanical Advantage System			
Lecture	0:15		
Activity 3-21: Operating and Directing the Operation of a Complex Rope Mechanical Advantage System		0:45	
Topic 3-22: Negotiating an Edge While Attached to a Rope Rescue System			
Lecture	0:30		
Activity 3-22: Negotiating an Edge While Attached to a Rope Rescue System		1:30	

Segment	Lecture Time	Activity Time	Total Unit Time
Topic 3-23: Accessing, Assessing, Stabilizing, Packaging, and Transferring Victims			
Lecture	0:30		
Activity 3-23: Accessing, Assessing, Stabilizing, Packaging, and Transferring Victims		1:30	
Topic 3-24: Operating and Directing a Litter-Lowering and Litter-Raising System in a Low-Angle Environment			
Lecture	0:15		
Activity 3-24: Operating and Directing a Litter-Lowering and Litter-Raising System in a Low-Angle Environment		1:00	
Topic 3-25: Operating as a Litter Tender			
Lecture	0:30		
Activity 3-25: Operating as a Litter Tender		1:30	
Topic 3-26: Directing a Litter-Lowering or Litter-Raising Operation in a High-Angle Environment			
Lecture	0:15		
Activity 3-26: Directing a Litter-Lowering or Litter-Raising Operation in a High-Angle Environment		1:00	
Topic 3-27: Selecting, Constructing, and Using Travel Restrictions			
Lecture	0:15		
Activity 3-27: Selecting, Constructing, and Using Travel Restrictions		1:00	
Topic 3-28: Constructing and Operating Ladder Rescue Systems			
Lecture	1:00		
Activity 3-28: Constructing and Operating Ladder Rescue Systems		4:00	
Topic 3-29: Terminating a Technical Rescue Operation			
Lecture	0:15		
Activity 3-29: Terminating a Technical Rescue Operation		0:15	
Unit 3 Totals	**9:45**	**26:15**	**37:00**

Segment	Lecture Time	Activity Time	Total Unit Time
Lecture, Activity, and Unit Totals:	**12:15**	**26:45**	**39:00**

Course Totals

Total Lecture Time (LT)	12:15
Total Activity Time (AT)	26:45
Total Testing Time (TT)	1:00
Total Course Time	**40:00**