Chapter 3: Hazards associated with rope rescue

Chapter Overview

When calling in an emergency, it is a common expectation that a responding agency will send personnel who possess the training, tools, and skills to resolve the emergency. Rescues generally follow someone being injured, fallen ill, or gotten themselves in a predicament they are unable to remove themselves from. In turn, they report the emergency. Emergency responders are trained to enter the scene of an emergency for the specific purpose of providing assistance to others, while most run from the dangers, Responders rely on their training to maintain their safety and the safety of others during a response. Rescuers need to maintain this level of safety because an injured responder cannot assist others in need. An understanding of the types of incidents the department may be dispatched to, as well as the specific risks associated with those incidents, are needed to ensure that the highest level of safety can be maintained during responses.

Objectives and Resources

**Knowledge Objectives**

After studying this chapter, you should be able to:

 Explain the purpose of a hazard identification and risk assessment. (NFPA 1006: 5.1.3, pp. 34–35)

 Explain the purpose of a rescue preplan. (pp. 35 – 37)

 Identify the hazards associated with rope rescue incidents. (NFPA 1006: 5.1.3, pp. 35–39)

 Describe how to maintain situational awareness. (p. 39)

 Describe the considerations for maintaining an accurate perception of the rescue environment. (pp. 39 – 40)

 Identify the methods of managing the risks associated with rope rescue. (NFPA 1006: 5.1.3, pp. 37–40)

 Identify the methods of communication that may be used during a rope rescue incident. (pp. 40 – 41)

 Explain ways to ensure rescue teams create a shared mental model. (pp. 41 – 42)

 State the role of the incident safety officer at rope rescue incidents. (NFPA 1006: 5.1.3, pp. 43–44)

 Explain the importance of critical incident stress management. (pp. 44 – 46)

**Skill Objectives**

There are no skill objectives for this chapter.

Support Materials

 Dry-erase board and markers or chalkboard and chalk

 LCD projector, slide projector, overhead projector, and projection screen

 PowerPoint presentation or slides

 **Navigate for Students**

 **Advantage**

 Each printed textbook comes with an access code that unlocks several valuable teaching and learning assets including:

 **Navigate eBook**.

 Online and offline accessibility ensures that the eBook is always available. Offline interactions are captured, cached, and uploaded the next time they are connected to the Internet.

 **Navigate for Instructors**

 **ACCESS LEVELS**—Differing levels of access meet the needs of traditional, hybrid, and distance learning courses.

 **LMS COMPATIBILITY**—A fully hosted and supported online learning solution. It is also available for deployment in third-party learning management solutions, such as Blackboard and Canvas.

 **ANALYTICS**—Dashboards for the instructor enables access to real-time, actionable data.

 **SUPPORT & TRAINING**—A Navigate Implementation Specialist will be your personal resource to answer questions, set-up your course, and maintain your customizations from semester to semester.

Reading and Preparation

Review all instructional materials, including *Rope Rescue,* Fifth Edition, Chapter 3, and all related presentation support materials.

Chapter Presentation Overview

Pre-lectur

I. You Are the Rescuer

Small-Group Activity/Discussion

Purpose



The purpose of this activity is to introduce students to concepts surrounding the understanding and management of water rescue incidents.

Instructor Directions

1. Direct students to read the “You Are the Rescuer” scenario found at the beginning of Chapter 3 (p. 34).

2. You may assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question. Facilitate a class dialogue centered on the discussion questions.

3. You may also assign this as an activity and ask students to turn in their comments on a separate sheet of paper.

Lecture

I. Introduction

A. Review the learning objectives

B. *Emergency*

1. A situation that poses a threat to life or property

2. Expectation that responders will possess the training, tools, and skills to resolve any issues

C. While most run from danger, responders run toward it

1. Rely on training and experiences to maintain their safety, and that of others

2. *Go-Fever*

a. Heightened sense of responsibility, fueled by expectations, or bystanders, and action

b. Hurry to execute a plan or act without any thought of safety

c. Has no place in emergency response

d. Injured rescuers are unable to help

D. Two elements to maintain safety

1. Understand the types of incidents you respond to

2. Understand the risks of those incidents

II. Hazard Identification and Risk Management

A. Should be conducted by AHJ within the response area

1. Identifies potential risks

2. Develops corresponding rescue plans

B. *Hazard identification*

1. Examination of what things cause danger

C. *Risk assessment*

1. Determining how dangerous a hazard is

D. Begin with the surrounding area, its terrain, and the people living in it

1. Scope

a. What will it look like, likelihood of occurrence, how big or far reaching, what capabilities will be required

b. Big picture view

2. Frequency

a. How often does it occur

b. Number of resources needed if multiple incidents at once may be possible

c. *Interagency agreements, memorandum of understanding*, or other agreements may be needed

3. Magnitude

a. What is the likely impact of the incident

4. Findings also develop needed resources for efficient rescues

III. Preparing for Hazards

A. All responders should have an awareness-level training for the disciplines in their response area.

1. Should have an understanding of what response is needed

2. Identify the type of incident

3. Initiate the correct response of resources

B. *Rescue preplan* should be written if there is a greater likelihood of an incident.

1. Should address common or unique factors for the incident

2. May include hazard locations, guidance on personal safety, anchorage identification, and suggested rescue procedures

3. Should be documented and revisited annually

4. For rope rescue calls, identify:

a. Level of responders

b. Estimated number of responders needed

c. Equipment needed

d. Location of equipment (either internal use or if borrowed from another department)

5. Preplan may be generic or site specific.

6. When multiple disciplines overlap or there is an increase of hazards, more specificity may be needed.

7. Should address working with trained workplace personnel already on site

a. Knowledge of onsite special equipment

C. Employers whose personnel are exposed to risks are required by OSHA to provide a “prompt” rescue.

1. Expedient enough rescue to prevent further harm

a. Self-rescue attempts

b. Employee assisted rescue attempts

2. Beneficial for both employer and rescue crew to integrate the preplan for greater efficiency

D. Better preplanning means better understanding of the equipment used, access methods available, and specific risks and hazards in a response area.

IV. Hazards Associated with Rope Rescue

A. Rescue Incident Safety Control Chart (RISC)

1. Simple visual tool to help identify specific hazards, acknowledge associated risks, and visualize strategies to mitigate

2. Every identified risk should state:

a. Who is potentially at risk

b. What triggers the risk

c. What can be done to mitigate the risks

d. What defense can be made to protect against risks that slip through mitigation efforts

B. Specific hazards

1. Avoid entering terrain or environments when not prepared to assess, mitigate, and defend against specific hazards.

2. Access adjacent to, rather than above or below a subject

a. If accessing from above or below, attempt to stay out of the direct fall line as much as possible.

3. Limited entry points

a. Create delay in rescuers reaching subject.

b. Avoid creating alternate routes.

c. Scout evacuation routes upon onset of arrival.

C. Protection against falls and other hazards

1. Awareness-level rescuers should be provided with PPE against falls consistent with what a worker would use to make access or perform similar work would have.

a. Must have adequate protection, not employ the same equipment or skills

2. Rescuers should employ equivalent degrees of fall protection as workers.

a. Equipment used and methods employed may be task specific.

3. *Maximum arrest force* should be limited to 1800 lbf.

4. *Average arrest force* should be limited to 900 lbf.

D. Always watch for items dropped when working in a vertical plane.

1. Wear a helmet.

2. Tether small equipment.

3. Large equipment needs a separate rope system.

E. Additional hazards

1. Environmental conditions

2. Hazardous material exposure

3. Physical hazards

4. Assessment may be difficult, and situation tends to change rapidly.

V. Situational Awareness

A. The ability to know what is going on around us.

B. Must be coupled with ability to efficiently assess and use the information to take appropriate actions

C. There are three levels of situational awareness:

1. Level 1

a. Ability to accurately recognize the moving parts in a current situation

2. Level 2

a. Ability to understand the moving parts in a current situation

3. Level 3

a. Ability to understand how the moving parts will shift, and how to anticipate the changes

D. Human factors are the most difficult to understand and train.

1. Equipment failure is rare.

2. Most failure comes from human error.

VI. Risk Management

A. *Risk* is a probability that can be assessed, calculated, and managed.

B. *Susceptibility is the* likelihood of being exposed to the hazard.

C. *Resilience* is the mitigation of the effects, or ability to maintain safety within the hazard.

D. Risk management focuses on reducing susceptibility and increasing resilience.

E. *Operational Risk Management* is the systemic process to assess and manage risks continuously.

F. *Time Critical Risk Management* is designed with the understanding that risk management is challenging when time and resources are limited.

1. Risks identified and controlled using an established set of policies and procedures throughout the incident.

2. Following are the principles of TCRM:

a. Accept risk when benefits outweigh the cost.

b. Accept no unnecessary risks.

c. Anticipate and manage risk by planning.

d. Make risk decisions at the right level.

G. Unique stresses on responders often cause breakdown with operational risk management.

1. US Navy developed the ABCD mnemonic to assist in better analysis and application.

a. A – Assess the situation

b. B – Balance resources and options

c. C – Communicate intentions

d. D – Do it

e. Follow up with a debrief using the ABCD mnemonic.

H. Remember your safety is priority.

1. Fellow rescuer safety is next.

2. Subject safety is third.

3. Bystander safety is fourth.

VII. Communicating for Risk Management

A. Communication methods and communication skills both need to be honed.

B. Rope rescue communication includes:

1. Verbal

a. Generally used for briefings before and during an incident

b. Includes operational issues, discussion of concerns, commands during rope rescue operation

c. Keep chatter to a minimum, only stating what is necessary.

d. State information clearly, firmly, and loudly without shouting.

2. Radio

a. More important to avoid unnecessary chatter

b. More difficult to understand

c. May create confusion if message is not clear

3. Hand signals

a. May be needed in loud areas

b. Used when voice or radio communication is not effective

c. Must be preplanned and agreed upon

4. Clear communication

a. Information pertaining to the operation should be shared.

b. Well-informed rescuers perform more effectively.

c. Ensure all communications are clearly understood.

i. Sender and receiver of information both need to ensure the message was communicated correctly.

VIII. Creating a Shared Mental Model

A. Ensures all members of the team understand the task and how to achieve the task

B. Performance is improved by ensuring:

1. Familiar with one another’s roles and responsibilities

2. Able to anticipate the needs of other team members

3. Able to adapt to changing needs

C. Helps teamwork by breaking down boundaries and reducing perception of power between regular responders and outside specialists

1. Continuous updates on status and goals ensures no team members stray from the focused goal.

D. Foundation for shared mental model begins with good team briefing.

IX. Team Briefings

A. Should include information relevant to the operation

1. Allows all responders to know the common baseline for the operation

B. Should include, at least, the following:

1. Subject situation

2. Environmental conditions

3. Safety concerns

4. Operational goal

a. Individual roles and responsibilities

b. Anticipated plan

c. Identification of known tasks

5. Review of “what-if” scenarios

6. Allow for clarification through questions

X. Explicit Communication

A. Should be made clearly and overtly, leaving no room for interpretation

B. Err toward stating the obvious rather than risking misunderstanding or missed information

C. Do not anticipate another rescuer’s moves; ask or tell them what needs to be done.

D. Six components of direct statements:

1. Address the person you are talking to by name.
2. Begin with “I.”
3. State your message as clearly as possible.
4. Use appropriate tone for the message.
5. Require a response.
6. Do not disengage until an understanding is reached.

E. *Closed-loop communication* is when the requester makes a direct and explicit request; receiver acknowledges the request and states when it is complete (if applicable).

F. State the name of the recipient and make eye contact, if possible, to ensure clear communication.

1. Also allows for clarification if needed.

G. Good emergency communications should:

1. Maintain good communication with leadership, team member, and others involved.

2. Provide clear instructions and ensure they are understood.

XI. Incident Safety Officer

A. Identified command staff function that directly supports the incident commander and contributes to the overall management of the incident

B. An operational necessity during potentially hazardous activities

1. Performs a reconnaissance of the incident for hazards

2. Provides IC with risk assessment of scene and operations taking place

3. ISO can initiate actions to mitigate hazards.

C. ISO should make sure all rescuers are aware of the safety and hazard zones.

D. Has the authority to stop any potentially hazardous operations

E. In charge of ensuring all communications are free from barriers

F. Selection of ISO for rope rescue should be based on technical expertise in rope rescue procedures

1. Should have a thorough understanding of equipment, rigging, and rescue techniques

G. ISO does not get involved in other operational activities.

H. ISO monitors:

1. Personal safety equipment

2. Safe work practices for specialized equipment

3. Rescue rigging

4. Personal rigging

5. Identifiable hazards

6. Fatigue, hydration levels, and environmental exposure

I. Effective ways to reduce risks to rescue personnel:

1. Training that simulates encountered conditions

2. Rest and rehabilitation of personnel

3. Continuous evaluation of conditions

4. Reliance on experience of team members

J. Dirty Dozen of Human Errors

1. Lack of communication
2. Complacency
3. Lack of knowledge
4. Distractions
5. Lack of teamwork
6. Fatigue
7. Lack of resources
8. Pressure
9. Lack of assertiveness
10. Stress
11. Lack of awareness
12. Norms

K. Safety tip

* 1. Do not rush.
  2. Provide thorough briefings.
  3. Choose well-trained, experienced rescuers for the core of the team.
  4. Make sure rescuers are prepared for contingencies.
  5. Established well-marked hazard zones.
  6. Rescuers are tied in when working within 6 feet of an edge.
  7. Minimize number of personnel near an edge.
  8. Set an ISO.
  9. Safety checks before using systems
  10. Ensure redundant systems.
  11. Use appropriate PPE.
  12. Use edge protection.
  13. Establish safety lines where needed.
  14. Do not stand inside a bight under tension during a raising operation.
  15. Do not get on rope without adequate gear to ascend and descend.
  16. Inspect gear after every use.
  17. Secure loose gear.
  18. Keep adequate equipment with you for self-rescue.
  19. Avoid cross loading and tri-loading carabiners.
  20. Derig gear after a rescue starting from the cliff edge back to the anchors.

XII. Stress Management

A. Some of the most dangerous hazards are the long-term psychological impacts extending beyond the rescue.

B. *Critical incident stress management* is the practice of assisting those involved in a critical incident to share their experiences and perspectives, release their emotional response, and find ways to deal with the experience.

1. Simple debriefing may not always improve outcomes.

2. Stress injuries go far beyond the initial incident.

3. Are the result of collective influences over the span of a career

C*. Maritime Combat and Operational Stress Control program* states psychological stress is a continuum and not an isolated event.

D*.* Continuum stages include:

1. Ready – the stage of wellness

2. Reacting – low level of stress

3. Injured – ongoing wear and tear. Generally, calls for intervention

4. Ill – persistent injury. Life is significantly disrupted and quality impaired by effects

E*.* Goal is for everyone to maintain a healthy level of stress.

F.At injured and ill stages, family and coworkers play important roles in healing process.

G*.* Goals of psychological stress interventions:

1. Promote a sense of safety

2. Promote calming

3. Promote connectedness

4. Promote a sense of self and collective efficacy

5. Promote confidence and hope

XIII. Summary

 **The authority having jurisdiction (AHJ) should conduct a hazard identification and risk assessment to identify potential risks and develop corresponding response plans.**

 **The hazard identification and risk assessment should determine the scope, frequency, and magnitude of potential incidents.**

 **A rescue preplan should be developed for each potential incident identified during the hazard identification and risk assessment.**

 **A rescue incident safety control (RISC) chart is a visual tool to help identify specific hazards at a rescue site, acknowledge specific associated risks, and visualize strategies for contending with them.**

 **Specific hazards at rope rescue incidents include the potential to fall and limited entry points.**

 **Situational awareness is the ability to know what is going on around us and must be coupled with the ability to quickly and accurately assess and utilize the information to make good decisions and take appropriate actions. It is essential to maintain situational awareness to assess and mitigate hazards.**

 **Managing risk is a matter of managing the points at which hazards intersect with potential vulnerabilities.**

 **A mindset of ongoing risk–benefit analysis is an asset to any rescuer.**

 **Methods used for communication in rope rescue include verbal communication, radio communication, and hand signals.**

 **A pre-briefing ensures that all rescuers know:**

o **Subject situation**

o **Environmental conditions**

o **Safety concerns**

o **Goal of the operation**

o **Review foreseeable “what-if” scenarios**

o **Allow team members to ask questions and gain clarification.**

 **Clear communication is essential during an incident and depends upon using direct closed-loop communication.**

 **The incident safety officer (ISO) is a command level position and is responsible for making sure that all rescuers at a scene know the established safety zones and hazards. The ISO has the authority to stop any operation they see as a threat to safety.**

 **It has been determined that some of the most damaging hazards are the long-term psychological impacts that extend beyond the actual rescue. Take active measures to decrease stress, just as you would take active measures to don personal protective gear.**

Post-lecture

I. After-Action Review

Individual/Small-Group Activity/Discussion

On Scene

This activity is designed to help the student understanding how to approach a fire investigation. This activity incorporates both critical thinking and the application of basic trench rescue knowledge.

Purpose

To allow students an opportunity to develop responses to critical thinking questions.

Instructor Directions

1. Direct students to read the “On Scene” questions located in the After-Action Review section at the end of Chapter 3 (p. 34).

2. Direct students to read and individually answer the discussion questions. Allow approximately 10 minutes for this part of the activity. Facilitate a class review and discussion of the answers, allowing students to correct responses as needed.

3. You may also assign these as individual activities and ask students to turn in their comments on a separate piece of paper.

Answers

1. What types of environments exist in your jurisdic­tion that might lend themselves to rope rescue? How frequently are these likely to occur?

Specific responses will vary by location, but may include references to industrial confined spaces, buildings with exterior maintenance personnel, recreational climbing areas, bridges and structures, amusement facilities, and more.

2.What kinds of risks can you imagine that might affect rescuers who are performing rope rescue in the environments identified in question 1?

Specific responses will vary by location, but may include references to falls from height, being struck by falling objects, chemical contaminants, structural integrity of surfaces, traffic, weather and environmental conditions, and more.

3.What distractions are likely to create additional hazards for rescuers during rope rescues?

Specific responses will vary by location, but may include references to go-fever (sense of urgency), injury type, bystanders, personal condition, environmental factors, nearby machinery operations, and more.

4.Discuss the five goals of psychological stress intervention, and some possible methods to achieve them.

a. Promote a sense of safety (Assure the subject that you are there to help).

b. Promote calming (Encourage the subject to breathe slowly and recognize positive aspects of situation).

c. Promote connectedness (Use the word “we” and talk about working together to resolve the situation).

d. Promote a sense of self and collective efficacy (Talk to the subject about themselves, what is important to them, and what they have done/are doing well).

e. Promote confidence and hope (Talk about the future – what happens after the present situation is resolved, what they can look forward to, things they might want to achieve).

II. Lesson Review

Discussion

Note: Facilitate the review of this lesson’s major topics using the review questions as direct questions or slides. Answers are found throughout this lesson plan.

1. What is an emergency? (Lecture I B)

2. What are hazard identification and risk assessment, and how do they differ? (Lecture II B,C)

3. What is a rescue preplan and what are some of its components? (Lecture III B)

4. What should a Rescue Incident Safety Control Chart state for risks? (Lecture IV A)

5. Explain the three levels of situational awareness. (Lecture V C)

6. What are the principles of Time Critical Risk Management? (Lecture VI F)

7. What does the US Navy ABCD mnemonic stand for? (Lecture VI G)

8. What are common communication techniques in rope rescue? (Lecture VII B)

9. Why is a shared mental model important? (Lecture VIII A,B,C)

10. What should be included in a team briefing? (Lecture IX B)

III. Assignments

Lecture

A. Advise students to review materials for a quiz (determine the date/time).

B. Direct students to read the next chapter in *Rope Rescue, Fifth Edition*, as listed in your syllabus (or reading assignment sheet) to prepare for the next class session.