

Technical Rescuer

Lesson One

Rescue Operations

DOMAIN: COGNITIVE

LEVEL OF LEARNING: COMPREHENSION

MATERIALS

Fire Service Search and Rescue, 7th Edition, IFSTA 5th Edition Essentials of Firefighting; NFPA 1006, NC Highway Incident Safety Guidelines DVD, 2009; Standard for Technical Rescuer Professional Qualifications; NFPA 1670, Standard on Operations and Training for Technical Rescue Incidents; laptop computer; multimedia projector; whiteboard or flipchart; and marker pens.

NFPA 1006, 2013 Edition JPRs

- 5.2.1 Identify the needed support resources
- 5.2.2 Size up a rescue incident
- 5.2.3 Manage incident hazards
- 5.2.4 Manage resources in a rescue incident
- 5.2.5 Conduct a search
- 5.2.6 Terminate the incident
- 5.2.7 Access a victim
- 6.1.1 Direct the operation of a simple rope MAS
- 6.1.2 Direct a lowering operation
- 6.1.3 Construct a multiple-point anchor system
- 6.1.4 Construct a compound rope mechanical advantage system
- 6.1.5 Construct a fixed rope system
- 6.1.6 Direct the operation of a compound rope mechanical advantage system
- 6.2.2 Move a victim in a high-angle or vertical environment
- 6.2.5 Direct a team in the construction of a high-line system
- 6.2.6 Direct a team in the operation of a rope system in a horizontal path such as a high-line system

Junior Member Statement:

Junior Member training activities should be supervised by qualified instructors to assure that the cognitive and psychomotor skills are completed in a safe and non-evasive manner. While it is critical that instructors be constantly aware of the capabilities of all students both mentally and physically to complete certain tasks safely and successfully, the instructor should take every opportunity to discuss with departmental leaders and students the maturity and job awareness each participant has for the hazards associated with fire and rescue training.

TERMINAL OBJECTIVE

The Technical Rescuer candidate shall correctly describe in writing the necessary elements of a site survey, pre-incident planning, scene size-up, hazard assessment procedures, incident action planning, and command responsibilities associated with rescue related incidents.

ENABLING OBJECTIVES

1. The Technical Rescuer candidate shall correctly identify in writing the necessary certification requirements to move through the Technical Rescuer process.
2. The Technical Rescuer candidate shall correctly identify in writing the elements that make-up the 1006 standard and what fundamental knowledge is achieved within each specialty certification.
3. The Technical Rescuer candidate shall correctly identify in writing the necessary elements of a successful site survey associated with incidents involving different rescue environments.
4. The Technical Rescuer shall correctly describe in writing, the necessary elements of successful pre-planning as they relate to rope rescue incidents.
5. The Technical Rescuer candidate shall correctly describe in writing the factors that rescuers must know to effectively perform a scene size-up associated with incidents involving the different rescue environments.

6. The Technical Rescuer candidate shall correctly describe in writing the types of hazards and their consequences for rescuers that must be included in a hazard assessment associated with incidents involving the different rescue environments.
7. The Technical Rescuer candidate shall correctly describe in writing the necessary elements for implementing an On-Scene Operational Plan or Incident Action Plan (IAP) associated with incidents involving the different rescue environments.
8. The Technical Rescuer candidate shall correctly describe in writing the responsibilities of command and the primary functions of command associated with incidents involving the different rescue environments.
9. The Technical Rescuer shall correctly identify in writing various consensus standards related to rope rescue and how each standard addresses rope usage at fire and rescue incidents.

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INTRODUCTION

NFPA 1006, 2013 Edition, Standard for Technical Rescuer Professional Qualifications describes the job performance requirements for the thirteen specific rescue environments. They include rope rescue, confined space rescue, trench rescue, structural collapse rescue, vehicle and machinery rescue, surface water rescue, swift water rescue, dive rescue, ice rescue, surf rescue, wilderness rescue, mine and tunnel cave rescue. Chapter Five of this standard identifies the requirements for proper site operations, victim management, and maintenance for all of these disciplines. The JPRs for proficient site operations are covered by this lesson plan. This lesson plan and all the lesson plans explaining the JPRs of chapter five of NFPA 1006 should be completed by the Technical Rescuer candidate before they advance to any of the specific rescue disciplines.

MOTIVATION

The instructor should cover the basic elements of site operations here and touch on specifics unique to any of the various rescue environments. The authority having jurisdiction (AHJ) and the instructor may choose to emphasize one discipline more than another, as it may be a primary response for them. This is acceptable as long as the fundamentals of site operations for all rescue environments are adequately covered.

The importance of setting up and maintaining proper site operations for any incident, from beginning to end, cannot be over emphasized. Scene management is critical to running an operation efficiently and safely. A rescue operation that “runs like a well-oiled machine” benefits rescuers and patients while reducing wear on equipment.

PRESENTATION

ENABLING OBJECTIVE #1

The Technical Rescuer candidate shall correctly identify in writing the necessary certification requirements to move through the Technical Rescuer process.

1. Discuss prerequisite requirements for certification.
 - a) Medical requirements – EMT, 1st Responder, or EMC/FFI.
 - b) Hazardous Materials – Must complete Awareness and Operations levels.
 - c) Age and Education – Candidate must be 18 years of age (before certificate can be issued) and must have a minimum of a high school diploma or GED equivalent.

2. Discuss the Technical Rescuer certification process.
 - a) Candidate must meet the forementioned prerequisite requirements.
 - b) Candidate must complete General (NFPA 1006 Chapter 5) plus one additional chapter for certification.

3. Identify all certification levels available to North Carolina responders within the TR Standard.
 - a) Chapter 5 & 6 – Technical Rescuer
 - b) Chapter 7 – Confined Space
 - c) Chapter 8 – Trench Rescue
 - d) Chapter 9 – Structural Collapse
 - e) Chapters 10 – Vehicle Rescue
 - f) Chapters 11 & 12 – Water Rescue
 - g) Chapter 16 – Wilderness Rescue
 - h) Chapter 19 - Machinery and Agricultural Rescue

NOTE: NFPA 1006 requires a prerequisite of Chapter 6 Ropes for Chapter 12 Swift Water Rescue. Therefore, because North Carolina has combined Surface and Swift Water Rescue, Chapter 5 & 6 is a prerequisite for Water Rescue.

ENABLING OBJECTIVE #2

The Technical Rescuer candidate shall correctly identify in writing the elements that make-up the 1006 standard and

what fundamental knowledge is achieved within each specialty certification.

1. Identify each specialty level and briefly discuss the information covered within each specialty.

a) Chapters 5 & 6 – Ropes

This program is designed to enhance the student's ability to perform critical skill sets that meet the Job Performance Requirements (JPR's) of NFPA 1006, Chapters 5 General and 6 Rope Rescue Requirements. This chapter covers many advanced aspects in the field of technical rope rescue. During this course, students will review technical rope rescue theories, techniques, and challenges to accurately and safely execute the skill sets required for professional certification. This course builds upon and enhances the basic skill sets attained from Chapter 5 – General. The topics include: Rescue Operations for the Technical Rope Rescuer, Scene Management, Rope Management, Mechanical Advantages, Anchors, and Rope Rescue Equipment. It also covers; Advanced Lowers and Raises, Ascending and Descending Fixed Lines, Patient Packaging, Victim Management, High Lines and the applicable OSHA regulations and other appropriate NFPA standards. The course is designed to prepare the rescuer for professional certification testing (written & practical skills) in accordance with NFPA 1006 Requirements Chapter 5 General & 6 Ropes.

b) Chapter 7 – Confined Space

This program is designed to enhance the student's ability to perform critical skill sets that meet the Job Performance Requirements (JPR's) of NFPA 1006, Chapter 7 Confined Space Rescue Requirements. This chapter covers many advanced aspects in the field of Confined Space Rescue. During this course students will review theories, techniques, and challenges encountered during confined space emergencies to accurately and safely execute the skill sets required for professional certification. The topics include: Rescue Operations for the Technical Rescuer at Confined Space Incidents, Scene Management,

Mechanical Advantages, Improvised Anchor Systems, Air Management, SCBA, Supplied Air Systems, Atmospheric Monitoring, Ventilation, Victim Management and the applicable OSHA regulations and other appropriate NFPA standards. The course is designed to prepare the rescuer for professional certification testing (written & practical skills) in accordance with NFPA 1006 Requirements Chapter 7 Confined Space.

- c) Chapter 8 – Trench Rescue
This program is designed to enhance the student's ability to perform critical skill sets that meet the Job Performance Requirements (JPR's) of NFPA 1006, Chapter 8 Trench Rescue Requirements. This chapter covers many advanced aspects in the field of Trench Rescue. During this course, students will review theories, techniques, and challenges encountered during Trench emergencies to accurately and safely execute the skill sets required for professional certification. The topics include: Rescue Operations for the Technical Rescuer at Trench Incidents, Scene Management, Mechanical Advantages, Improvised Anchor Systems, Protective Systems, Heavy Lifting, Atmospheric Monitoring, Ventilation, Victim Management and the applicable OSHA regulations and other appropriate NFPA standards. The course is designed to prepare the rescuer for professional certification testing (written & practical skills) in accordance with NFPA 1006 Requirements Chapter 8 Trench.

- d) Chapter 9 – Structural Collapse
This program is designed to enhance the student's ability to perform critical skill sets that meet the Job Performance Requirements (JPR's) of NFPA 1006, Chapter 9 Structural Collapse Rescue Requirements. This chapter covers many advanced aspects in the field of structural collapse rescue. During this course, students will review theories, techniques, and challenges encountered during a structural collapse to accurately and safely execute the skill sets

required for professional certification. The topics include: Rescue Operations for the Technical Rescuer at Structural Collapse Incidents, Scene Management, Structural Engineering, Heavy Lifting, Shoring, Breaching and Breaking, Metal Cutting, Ventilation, Rescue Equipment, Atmospheric Monitoring, Victim Management and the applicable OSHA regulations and other appropriate NFPA standards. The course is designed to prepare the rescuer for professional certification testing (written & practical skills) in accordance with NFPA 1006 Requirements Chapter 9 Structural Collapse.

- e) Chapter 10 – Vehicle Rescue
This program is designed to enhance the student's ability to perform critical skill sets that meet the Job Performance Requirements (JPR's) of NFPA 1006, Chapter 10 Vehicle Rescue Requirements. This chapter covers many advanced aspects in the field of vehicle and machinery rescue. During this course, students will review theories, techniques, and challenges encountered during a vehicle or machinery emergency where patient extrication is necessary to accurately and safely execute the skill sets required for professional certification. The topics include: Rescue Operations for the Technical Rescuer at Vehicle and Machinery Rescue Incidents, Scene Management, Stabilization, Vehicle Concepts and Anatomy, New Technology, Extrication Techniques, Proper PPE, Victim Management, and the applicable OSHA regulations and other appropriate NFPA standards. The course is designed to prepare the rescuer for professional certification testing (written & practical skills) in accordance with NFPA 1006 Requirements Chapter 10 Vehicle Rescue.

- f) Chapters 11 & 12 – Surface Water Rescue
This program is designed to enhance the student's ability to perform critical skill sets that meet the Job Performance Requirements (JPR's) of NFPA 1006, Chapter 11 Surface Water Rescue and Chapter 12 Swift Water Rescue

requirements. This chapter covers many advanced aspects in the field of Surface and Swift Water Rescue. During this course, students will review theories, techniques, and challenges encountered during a surface and swift water rescue to accurately and safely execute the skill sets required for professional certification. The topics include: Rescue Operations for the Technical Rescuer at Water Incidents, Scene Management, Proper PPE, Medical Concerns, Ice Rescue, Shore Based Rescue Techniques, Boat Operations in Still Water, Basic Hydrology, Victim Management and the applicable OSHA regulations and other appropriate NFPA standards. The course is designed to prepare the rescuer for professional certification testing (written & practical skills) in accordance with NFPA 1006 Requirements Chapter 11 Surface Water Rescue.

- g) Chapter 16 – Wilderness Rescue
This program is designed to enhance the student's ability to perform critical skill sets that meet the Job Performance Requirements (JPR's) of NFPA 1006, Chapter 16 Wilderness Rescue Requirements. This chapter covers many advanced aspects in the field of wilderness rescue. During this course, students will review theories, techniques, and challenges encountered during a wilderness rescue to accurately and safely execute the skill sets required for professional certification. The topics include: Rescue Operations for the Technical Rescuer at Wilderness Rescue Incidents, Scene Management, Proper PPE, Medical Concerns, Map Orienteering, Compass Reading, Survival Techniques, Survival Equipment, Search Techniques, Resources, Victim Management and the applicable OSHA regulations and other appropriate NFPA standards. The course is designed to prepare the rescuer for professional certification testing (written & practical skills) in accordance with NFPA 1006 Requirements Chapter 16 Wilderness Rescue.

ENABLING OBJECTIVE #3

The Technical Rescuer candidate shall correctly identify in writing the necessary elements of a successful site survey associated with incidents involving different rescue environments.

1. Define site-survey.
 - a) A component of pre-planning that identifies existing or potential hazards that may cause initiation of a rescue response in a particular district. The act of conducting on-site surveys of locations that have a high potential for a rescue incident allows rescue personnel to develop a better needs assessment profile.
2. What is a needs assessment? Discuss with the class the benefit of site-surveys when creating a needs assessment document for their department.
3. Discuss the importance of good pre-planning efforts such as site-surveys.
 - a) Helps to show permanent hazards for the area.
 - b) Helps to show previous rescue locations and situations.
 - c) Helps with determining the frequency of, and potential for, incidents occurring at specific locations.
 - d) Helps to determine the proper PPE and equipment for the job.
4. Have students identify “site-survey problems” associated with rescue incidents. Use as an example, problems associated with agricultural rescue such as entrapments, confined spaces, livestock or environmental hazards. Be sure to review problems associated with the rescue situations listed below.
 - a) Vehicle.
 - b) Aircraft.
 - c) Railroads.
 - d) Agriculture.
 - e) Industrial.
 - f) Structural collapse.
 - g) Cave-Ins/Trench sites.
 - h) Elevated areas.
 - i) Confined spaces.

- j) Water hazards.
- k) Elevators.
- l) Special rescue situations such as mine and cave rescue.
- m) Public utilities.

Reference: Fire Service Search and Rescue, 7th Edition, pages 7 – 17, 168 – 173, 199 – 202, 245 – 248, 289, 329 – 332, and 413 – 430.

Reference: J&B Fundamentals of Technical Rescue, Chapter 3.

5. Taking into consideration the various response districts, have your students answer the following questions related to preparing a site-survey.
 - a) Where have previous rescues occurred?
 - b) What types of prior rescue/recovery operations have occurred?
 - c) What is the frequency of rescues at any of the given locations?
 - d) How severe or involved have the rescues been?
 - e) What obstacles have made the rescues more difficult?
 - f) What is the current response time for personnel and equipment, both local and mutual aid if required?
 - g) Has the department been sufficiently equipped for these responses?
6. Identify the value of current area maps such as commercial, orthophoto, topographical, hand-drawn, tax office, and utilities maps such as sewer and water, gas, electrical, and phone.
 - a) They allow the Incident Commander (IC) to better plan a tactical operation.
 - b) They may be used to show prior rescue and recovery operations. Topographic maps of 1 – 24,000 scale are the most prevalent for search.
7. Have available, samples of maps that may be helpful for a rescue operation.
8. Point out and demonstrate that the Universal Transverse Mercator (UTM) grid system is very helpful for location planning. Demonstrate and discuss the system with the class. USNG System, see attachment.

Reference: J&B Fundamentals of Search and Rescue.

9. Select several different rescue disciplines. Ask students to explain how maps and plans are useful in the different disciplines and the different physical environments.
 - a) Use an example such as the water rescue discipline that involves the different physical environments such as swift water in the mountains versus surf and tidal along the coast. Ask the students to explain how various maps are beneficial.
10. Discuss how building plans help in some rescue environments.
 - a) They denote construction design and materials.
 - b) They identify entry and egress points.
 - c) They identify occupancy type.
 - d) They identify safety features.

Reference: Fire Service Search and Rescue, 7th Edition, pages 191 and 192.

Reference: IFSTA 6th Edition Essentials of Firefighting, pages 1256 through 1260.

11. Discuss the importance of a well trained telecommunicator regarding responses to rescue incidents.
 - a) What is the telecommunicator's role?
 - b) How does the telecommunicator provide 'customer service?'
 - c) What skills are necessary for the telecommunicator to perform their job efficiently?
12. Discuss the role the telecommunication center plays in emergency responses.
 - a) What is the function of the telecommunication center?
13. Discuss the types of communication equipment.
14. Discuss recording information. Why is it important to record?

15. Discuss the procedures for receiving non-emergency phone calls.
16. Discuss the procedures for receiving emergency phone calls.
17. Discuss the procedures for alerting fire/rescue personnel.
18. Describe the AHJ's standard radio communication practices? Ask the students to discuss any communications practices they are familiar with.

Reference: IFSTA 6th Edition Essentials of Firefighting, pages 95 through 128.

19. List the identities and means of contact for additional available resources in your area such as the Coast Guard, Wildlife Commission, Department of Transportation, gas company, electric/telephone, cable, water/sewer departments, local qualified fire and rescue departments, law enforcement, local adventure clubs, local fishing and boating clubs, city and county planning departments and tax offices.
20. Ask the candidates, "Does your department have a procedure in place to receive updates and changes from other agencies that may affect your response effectiveness?" Why is it important that they should have these procedures in place?
21. Using a local county map or one provided by the instructor and a simulated 911 call, ask the candidates to identify the correct responding department based on the 911 caller's directions. Have the students pinpoint access and egress routes for rescue personnel allowing for a fast response and safe operation. Discuss city and county mutual aid that might occur for any given 911 call.

Reference: Fire Service Search and Rescue, 7th Edition, pages 7 through 17.

Reference: IFSTA 6th Edition Essentials of Firefighting, pages 928 through 930.

PRESENTATION

ENABLING OBJECTIVE #4

The Technical Rescuer shall correctly describe in writing the necessary elements of successful pre-planning as they relate to rope rescue incidents.

1. Define and discuss a needs assessment and its components.
 - a) Conduct a pre-incident site survey by visiting potential rope rescue sites within the jurisdiction; including commercial, industrial and residential multi-story complexes, farms, cell towers etc.
 - b) Review call logs to determine the frequency of rope rescue operations at a given site.
 - c) What is the severity and complication of past and potential rope rescue operations?
 - d) What are the estimated response times to potential rope rescue locations?
 - e) Obtain area guidebooks, aerial photos.
 - f) Prepare hazard identification maps through geographic information systems (GIS).
 - g) Identify who will have jurisdictional and operational responsibility for rescue in a local area.
 - h) What personnel and equipment requirements are necessary for all risk locations?

Reference: High Angle Rescue Techniques, 3rd Edition, page 166.

Reference: CMC Rope Rescue Manual, revised 4th Edition, pages 289-299.

2. Discuss the reasons for conducting a thorough pre-incident site survey.
 - a) It provides for a detailed evaluation of existing hazards at potential rope rescue locations.
 - b) It examines previous locations where rope rescue operations were conducted and their associated situations.
 - c) A pre-incident site survey aids in determining the frequency of, and potential for, rope rescue incidents occurring at specific locations.
 - d) It allows for determination of the proper rope rescue PPE and equipment required for a given location and operation.

3. Discuss the importance of obtaining detailed contact information for each resource.
 - a) Do these entities provide current information on present hazards?
 - b) Do they provide information on any changes regarding their response capabilities?
 - c) Are there any important changes for the TR? Are their departments aware of these changes?
 - d) Are there procedures in place to receive updates and changes from other agencies that may affect your response effectiveness?

4. Discuss past and potential rope rescue incidents for the given jurisdiction and have the Technical Rescuers point out specific “site-survey problems” associated with each incident. Examples might include problems associated with:
 - a) Industry.
 - b) Structural collapse.
 - c) Cave-ins.
 - d) Elevated areas, bridges, and overpasses.
 - e) Confined spaces.
 - f) Water hazards.
 - g) Elevators.
 - h) Special rescue situations such as mine and cave rescue.
 - i) Public utilities.

Reference: IFSTA 7th Edition Fire Service Search and Rescue, pages 7-17.

Reference: High Angle Rescue Techniques, 3rd Edition, page 166.

Reference: CMC Rope Rescue Manual, revised 4th Edition, pages 289-299.

5. Identify the various incident locations for the given jurisdiction, have the Technical Rescuers answer the following questions related to preparing a site-survey.
 - a) Where have previous rope rescue operations occurred?
 - b) What types of prior rope rescue/recovery operations have occurred?
 - c) What is the frequency of rope rescues at any of the given locations?
 - d) How technically complex have the rope rescues been?

- e) What obstacles have made rope rescue operations more difficult?
 - f) What is the current response time for personnel and equipment, both local and mutual aid, if required?
 - g) Has the department been sufficiently equipped for these responses?
 - h) Have rescue response personnel been adequately trained for these responses?
 - i) Are there specialized rope rescue teams available for response?
6. Discuss operational aspects of a pre-plan.
- a) How are requests for emergency assistance handled?
 - b) Who initiates an operational response for a rescue? Are backup resources and outside agencies alerted for assistance?
 - c) How does the rope rescue team fit into the incident management system and to whom do they report?
 - d) What is the command structure on scene?
 - e) What is the communication setup including radio frequencies?
 - f) How will medical control be contacted and what are the medical protocols?
 - g) Are SOGs in place for carrying out a rope rescue mission?
 - h) Identify the procedures for establishing a landing zone, and identify known aerial and ground hazards associated with landing a helicopter.
 - i) How does the team conform to regulations and standards?
 - j) Are there guidelines established for conducting a recovery operation?

Reference: High Angle Rescue Techniques, 3rd Edition, page166.

7. Identify and discuss the two important elements of evaluating a pre-plan.
- a) Review rescue tactics.
 - b) Review training deficiencies.
8. Identify and discuss the 5 requirements that must be met for the two pre-plan elements.

- a) Inventory available equipment, human resources, and their skill levels.
- b) Strengthen joint operational responses through interagency training.
- c) Identifying sites with recurring incidents and train at those sites.
- d) Evaluate your team to decide if the rescue team is ready for potentially very difficult rescues.
- e) Prepare for worst case scenarios.

Reference: High Angle Rescue Techniques, 3rd Edition, page167.

9. Discuss communication guidelines for on scene rope rescue operations.
- a) Effective communication is critical to the coordination of the operation and safety of all rescuers.
 - b) On scene conditions can play havoc with physical and electronic communication efforts.
 - c) Verbal commands may be blocked or misinterpreted by obstacles, high winds, or distance.
 - d) Electronic communications may be disrupted by confined spaces, natural obstructions such as rock overhangs and intervening ridgelines.
 - e) Choosing a simplex system (car to car) over a repeater system may be more effective as long as line of site is maintained by the rescuers.
 - f) Procedures should be established that ensures effective on-scene communications, especially when working with multiple agencies.
 - g) In most rope rescue operations the problem is not communicating, the problem is holding onto the radios. A solution to that problem is a radio chest harness.
 - h) Voice activated headsets (VOX) are effective for short range communications, but in tight spaces they may get hung up or pulled off the rescuer's head, and sometimes don't work well with many styles of helmets.
 - i) A bullhorn may be a good alternative as long as questions to the victim are short and concise, requiring the victim to answer only yes or no.
 - j) The victim may answer verbally or use a pre-arranged response signal using 1 arm lift or 1

flashlight click for YES and 2 arm lifts or 2 flashlight clicks for NO.

10. Discuss and demonstrate the acronym SUDRH as a suggestion for communicating with fellow rescuers using a whistle during a raising or lowering operation.
 - a) S – STOP (1 short blast).
 - b) U – UP (2 short blasts).
 - c) D – DOWN (3 short blast).
 - d) R – ROPE FREE (4 short blasts).
 - e) H – HELP (continued long blast).

Reference: High Angle Rescue Techniques, 3rd Edition, 173 through 174.

Reference: ASTM Standard F 1768 Guide for using Whistle Signals during rope rescue operations.

11. Discuss the purpose for NFPA 1670 Operations and Training for Technical Rescue Incidents, and how it may impact pre-incident planning and potential scene size-ups.
 - a) The document requires local jurisdictions to survey their response districts to assess the potential for various rescue incidents.
 - b) The Authority Having Jurisdiction (AHJ) shall make decisions regarding how to effectively respond and mitigate the problems associated with each rescue incident.
12. Point out that NFPA 1670, Chapter 4.1.1 requires the AHJ to develop procedures for the procurement and utilization of resources needed to conduct a safe and effective search and rescue operation.
 - a) The AHJ may choose to train and equip department personnel to meet all identified operational capabilities.
 - b) The AHJ may choose to enter into mutual aid with neighboring entities.
 - c) The AHJ may contract with private providers.
 - d) The AHJ may choose a combination of the above.
13. Identify and discuss the departmental functions for the Awareness Level response to rope rescue incidents as established by NFPA 1670.

14. Identify and discuss the departmental functions for the Operations Level response to rope rescue incidents.
15. Identify and discuss the departmental functions for the Technician Level response to rope rescue incidents as established by NFPA 1670.

Reference: NFPA 1670, 2009 Edition, Standard on Operations and Training for Technical Rescue Incidents.

16. Discuss how training integrates into the pre-planning process.
 - a) Periodic intensive training should be made available to all personnel who may be involved in the incident.
 - b) Training exercises give those who would be involved in an incident an opportunity to see the plan in action and test their understanding of the plan.
 - c) Any deficiencies can be identified and remedied.

Reference: IFSTA 7th Edition Fire Service Search and Rescue, page 195.

APPLICATION

Conduct a short class exercise. Have the Technical Rescuers demonstrate their ability to pre-plan a possible rope rescue operation using local county maps or one provided by the instructor and a simulated 911 call. Ask the Technical Rescuers to identify the correct responding department based on the 911 caller's directions. Have the Technical Rescuers pinpoint access and egress routes for rescue personnel allowing for a fast response and safe operation. Discuss city and county mutual aid that might be needed. Have the Technical Rescuers list the typical number of personnel, PPE, and equipment requirements for this rescue operation. If the location is an actual site where previous rope rescue operations have occurred, have the Technical Rescuers elaborate on what methods, equipment, and personnel were used in the past.

PRESENTATION

ENABLING OBJECTIVE #5

The Technical Rescuer candidate shall correctly describe in writing the factors that rescuers must know to effectively perform a scene size-up associated with incidents involving the different rescue environments.

1. Define scene size-up.
 - a) Size-up attempts to identify the nature and severity of the rescue incident, factoring in the type of rescue, number and location of victims, existing and potential on-scene hazards, confirms rescue versus recovery and helps to verify resource needs.
 - b) Size-up is an on-going process of observation and evaluation of the rescue scene for needed changes in strategic goals and tactical considerations for that incident.
2. Involve the students in a discussion of scene size-up considerations for the various rescue disciplines.
 - a) Discuss who and what can be useful in performing a scene size-up of a rescue scene.
 - b) List the various scene size-up considerations for each rescue discipline. What are some of the differences between the disciplines?
 - c) As an example, discuss the different considerations to take into account for structural collapse versus surface water rescue, or create your own example.
3. Define and discuss primary assessment procedures for scene size-up, their components, and when they should be used.
 - a) Point out the information gathering process.
 - b) Discuss decision-making and the appropriate priorities that should be recognized.
 - c) Discuss the importance of scene control.
4. Define and discuss secondary assessment procedures for scene size-up, their components, and when they should be used.
 - a) What kind of elevation difference?
 - b) What about hazard assessment?
 - c) What about the mode of operation?

Reference: Fire Service Search and Rescue, 7th Edition,

Pages 139 through 141, 173 through 175, 223 through 227, 256 and 259.

5. Discuss the importance of interviewing potential witnesses.
 - a) Where? Where was the person last seen?
 - b) Why? Reason the victim was in the situation that brought about the need for rescue.
 - c) Who? Description of the victim and clothing worn.
 - d) What? What time did the subject get hurt, entrapped or disappear?
 - e) When? When was their last meal or medications consumed. Was alcohol involved?

6. Emphasize considerations such as the ones listed below.
 - a) For missing persons, establish the point last seen.
 - b) For missing persons, determine the search area and how to search effectively.
 - c) What are the hazards present?
 - d) What is the necessary equipment and PPE?
 - e) What types of maps or plans are needed?
 - f) What other useful information can be used to help determine resource needs for an efficient and safe rescue response?

7. List and discuss the four components that a rescuer must apply to complete a successful rescue/recovery operation.
 - a) Knowledge of the techniques available to successfully perform a rescue or recovery.
 - b) The rescuer must have the skills necessary to perform the techniques.
 - c) Physical fitness needed to apply the skill
 - d) Judgment in determining which techniques to apply and when.

8. Discuss how these four components are useful in conducting a complete and successful rescue/recovery operation for each of the various rescue disciplines.

Reference: Fire Service Search and Rescue, 7th Edition, pages 7 through 17, 223 through 225, 323 through 347.

PRESENTATION

ENABLING OBJECTIVE #6

The Technical Rescuer candidate shall correctly describe in writing the types of hazards and their consequences for rescuers that must be included in a hazard assessment associated with incidents involving the different rescue environments.

1. Point out that each rescue discipline involves many associated hazards unique to that discipline.
2. List all the disciplines and point out the potential hazards that could accompany each rescue operation.
 - a) Examples of rope rescue hazards include elevated heights, loose debris, sharp edges, and abrasive surfaces. Secondary hazards include down power lines, unstable vehicle, hazardous material leakage, and fire/explosion.
 - b) Examples of structural collapse hazards include various types of collapse patterns, damaged utilities, atmospheric contamination, hazardous materials, dark voids, unstable debris, temperature extremes, noise, adverse weather, physical hazards, secondary collapse, confined spaces, below-grade spaces, and elevation.
 - c) Examples of confined space hazards include oxygen deficiency, oxygen enrichment, flammability, toxicity, physical hazards, structural instability, engulfment, darkness, temperature extreme, noise, moisture, and dust.
 - d) Examples of water rescue hazards include water currents, loads, entrapments, low head dam, polluted water, cold water, and the type of victim.
 - e) Examples of trench collapse hazards include unstable trench walls, hazardous objects within the trench, secondary collapse, surcharge, vibration, unsupported utilities, atmospheric hazards (same as for confined spaces), temperature extremes, noise, water accumulation, and dust.
 - f) Examples of hazards associated with electrical emergencies include downed energized lines, improper use or maintenance of dielectric

- equipment, and failure to identify the ground gradient area.
- g) Examples of caving hazards include darkness, water, passage irregularities, temperature extremes, and air movement.
 - h) Examples of hazards associated with agricultural emergencies include elevated structures (i.e. silos, grain bins, cisterns, wells, and atmospheric hazards, entrapments).

Reference: Fire Service Search and Rescue, 7th Edition, pages 141, 169 through 173, 191 through 192, 199 through 202, 245 through 248, 329 through 332, and 413 through 430.

3. Discuss how, through hazard assessment, these hazards can be minimized for the safety of the rescuers and patients.
- a) Include a discussion on scene control.
 - b) Explain the idea of isolation/evacuation.
 - c) Discuss establishing hazard zones.
 - d) Ask why personnel accountability/patient accountability is important?
 - e) What about entry permits?

Reference: Fire Service Search and Rescue, 7th Edition, pages 161 and 223 through 225.

4. Discuss the importance, for rescuer and bystander safety, of creating a hazard zone at a rescue incident.
- a) One popular model identifies three zones Hot, Warm and Cold.
 - b) Hot Zone is the area where the rescue is taking place. The size will vary dependent on the nature and extent of the problem. Only personnel who are dealing directly with treating or freeing victims should be permitted into this area.
 - c) Warm Zones are located adjacent to the Hot Zone; this area is for support personnel assisting those in the Hot Zone and staged equipment.
 - d) Cold Zones surround the Hot and Warm Zones. The command post, PIO, incoming personnel, and equipment waiting for assignment are located in this zone. The outer boundary of this zone should be cordoned off to the public.

- e) Other models are used throughout the rescue community.
- f) The AHJ should make the determination which model is most effective for the incident. Discuss what models are used by the AHJ.

Reference Fire Service Search and Rescue, 7th Edition, Pages 45 through 47, 146 and 147, 224 and 225, 258, 417 through 419.

Reference: IFSTA 6th Edition Essentials of Firefighting, pages 69 through 75.

Reference: J&B Fundamentals of TR, page 80.

- 5. For the following rescue disciplines, discuss the OSHA rules that on-scene personnel should be familiar with in order to begin initial scene size-up.
 - a) Trench: 29 CFR 1926.650-652.
 - b) Confined Space: 29 CFR 1910.146-147.
 - c) Mine Rescue: 29 CFR 49.1-10.
 - d) Haz-Mat 29 CFR 1910.120

NOTE: Instructors should obtain a copy of the above regulations and be familiar with their content.

PRESENTATION

ENABLING OBJECTIVE #7

The Technical Rescuer candidate shall correctly describe in writing the necessary elements for implementing an On-Scene Operational Plan associated with incidents involving the different rescue environments.

- 1. Define an On-Scene Operational Plan.
- 2. Point out the importance of obtaining any information available from previous search and rescue and recovery operations and the final results.
 - a) What were the strategies and tactics used?
 - b) How do previous responses compare with proposed operational guidelines?
- 3. Identify potential equipment needs for the various rescue disciplines.
 - a) The PPE for rescuers.
 - b) Tactical equipment for operations.

- c) Other related support and logistics needs.
4. Discuss the assessment procedures for determining the condition of the patient.
 - a) Where is the patient?
 - b) What is the level of consciousness?
 - c) What is the patient's location? Is the patient trapped or pinned or in other known peril?
 - d) What equipment is needed?
 - e) What hazards surround the patient?
 - f) How can the patient be accessed, stabilized, and removed?
 5. List the potential on-scene-environmental conditions that can occur in various rescue operations, and discuss their potential impact on the operation?
 - a) How important is the current time and weather?
 - b) 12 hour forecast.
 - c) How is daylight vs. night-time operations different?
 6. Is the operation a rescue, a recovery, or a combination of both?
 - a) How many patients and what are extent of injuries?
 - b) Discuss triage procedures for multiple patients.
 7. Discuss a Risk Benefit Analysis and its importance to a rescue operation.
 - a) Discuss the importance of time in assessing a rescue situation.
 - b) Discuss the relationship between the time the patient has been in need and the arrival of the rescuers.
 - c) How is the level of training of on-scene rescuers important to a Risk Benefit Analysis?

Reference: Fire Service Search and Rescue, 7th Edition, pages 35 and 36, 53 through 101.

Reference: J&B Fundamentals of TR Chapter 3.

PRESENTATION

ENABLING OBJECTIVE #8

The Technical Rescuer candidate shall correctly describe in writing the responsibilities of command and the primary functions associated with incidents involving the different rescue environments.

1. Discuss NIMS and the importance of the AHJ complying with NIMS.
 - a) Since the September 11, 2001, attacks on the World Trade Center and the Pentagon, much has been done to improve prevention, preparedness, response, recovery, and mitigation capabilities and coordination processes across the country.
 - b) A comprehensive national approach to incident management, applicable at all jurisdictional levels and across functional disciplines, would further improve the effectiveness of emergency response providers and incident management organizations across a full spectrum of potential incidents and hazard scenarios. Such an approach would also improve coordination and cooperation between public and private entities in a variety of domestic incident management activities.
 - c) On February 28, 2003, President Bush issued Homeland Security Presidential Directive 5 "*Management of Domestic Incidents*" (HSPD-5). HSPD - 5 directed the Secretary of Homeland Security to develop and administer a National Incident Management System.
 - d) NIMS provides a consistent nationwide template to enable all government, private-sector, and nongovernmental organizations to work together during domestic incidents.
 - e) NIMS provides a framework for interoperability and compatibility by balancing flexibility and standardization.
 - f) NIMS provides a flexible framework that facilitates government and private entities at all levels working together to manage domestic incidents. This flexibility applies to all phases of incident management, regardless of cause, size, location, or complexity.
 - g) NIMS provides a set of standardized organizational structures, as well as requirements for processes, procedures, and systems designed to improve interoperability.

2. Discuss the components of NIMS.
 - a) NIMS is comprised of several components that work together as a system to provide a national framework for preparing for, preventing, responding to, and recovering from domestic incidents. These components include:
 - b) Command and Management.
 - c) Preparedness.
 - d) Resource Management.
 - e) Communications and Information Management
 - f) Supporting Technologies
 - g) Ongoing Management and Maintenance.

3. Discuss National Preparedness and the associated requirement on the AHJ.
 - a) On December 17, 2003, the President issued Homeland Security Presidential Directive 8 "*National Preparedness*" (HSPD-8). The purpose of HSPD-8 is to "establish policies to strengthen the preparedness of the United States to prevent and respond to threatened or actual domestic terrorist attacks, major disasters, and other emergencies by requiring a national domestic all-hazards preparedness goal, establishing mechanisms for improved delivery of Federal preparedness assistance to State and local governments, and outlining actions to strengthen preparedness capabilities of Federal, State, and local entities."
 - b) This directive is a companion to HSPD-5, which identifies steps for improved coordination in response to incidents.

4. Discuss who must complete NIMS and ICS training.
 - a) Stakeholders will define the emergency management/response personnel within their jurisdiction, agency, or organization who require ongoing training. This includes all emergency services related disciplines such as EMS, hospitals, public health, fire service, law enforcement, public works/utilities, skilled support personnel, and other emergency management response, support and volunteer personnel.
 - b) Entry level personnel must complete IS-700: NIMS, and ICS-100.

- c) First Line, Single Resource, Field Supervisors must complete IS-700: NIMS, ICS-100, and ICS-200.
 - d) Middle Management: Strike Team Leaders, Division Supervisors, EOC Staff, must complete IS-700: NIMS, IS-800: NRF, ICS-100, ICS-200, and ICS-300.
 - e) Command and General Staff; Area, Emergency, and EOC Managers must complete IS-700: NIMS, IS-800: NRF, ICS-100, ICS-200, ICS-300, and ICS-400.
5. Discuss the importance of proper incident organization.
- a) Maintain scene control for safety.
 - b) Develop a primary strategy and a secondary strategy to ensure efficiency.
 - c) Discuss the concept of establishing command, span of control, and briefly explain divisions, groups, and branches.

Reference: IFSTA 6th Edition Essentials, pages 39 and 40.

6. List and discuss the important points that an IC must do at any rescue incident. Why are each of these points important?
- a) The IC must monitor the overall operation.
 - b) Establish and maintain a secure communication link between the dispatch center and responding resources.
 - c) Check to see if anything was missed during initial size-up.
 - d) Reassess operations periodically.
 - e) Evaluate if the situation has changed?
 - f) Are additional resources needed?
 - g) Reassess rescue personnel's mental and physical status periodically.
 - h) Effectively and safely terminate Command.
7. Discuss some of the command responsibilities necessary when directing a rescue / recovery incident.
- a) Assign tactical tasks to competent personnel.
 - b) Establish and maintain communications.
 - c) Ensure safety for all personnel involved.
 - d) Understand procedures for transferring command.
 - e) Understand procedures for terminating command.

8. Describe and discuss the functions of command.
 - a) Establish command and designate a command post location.
 - b) Determine the incident priorities and project the magnitude and duration of the incident.
 - c) Point out that if the operation is a recovery, it may continue for days.
 - d) Point out that a combination of rescue and recovery operations may deplete resources.

9. Describe and discuss the assessment of priorities at a rescue/recovery incident.
 - a) Emphasize rescuer safety.
 - b) What about patient access and patient stabilization?
 - c) How can you safely and efficiently conduct patient removal?

10. Point out that your assessment priorities include scene management such as traffic control, vehicle stabilization, and structural stabilization.

11. Describe and discuss how to ensure positive scene control.
 - a) What about security for evidence gathering and personnel?
 - b) What is the importance of identifying witnesses?
 - c) Establish a secured area for family members.
 - d) Isolation from spectators and control for rescue operations.
 - e) Establish an information/media center and appoint a PIO. If no PIO is assigned the responsibility of the PIO is with the Incident Commander.

Reference: IFSTA 6th Edition Essentials of Firefighting, pages 916 and 917.

12. Discuss the command structure for small-scale rescue operations.
 - a) Command may elect to control both strategy and tactics.
 - b) Experience of the incident commander is the determining factor.
 - c) Discuss the organizational chart for a small-scale event.

13. Discuss the command structure for large-scale rescue operations.
 - a) Command should be established and the necessary command and general staff positions should be assigned to maintain the continuity of the incident.
 - b) The amount of subdivision is determined by a needs assessment during the initial size-up phase. This process is continuous throughout the incident.
 - c) Discuss the organizational chart for a large-scale event.

14. Discuss with the class the various command structures with which they are familiar or have been involved.

15. Discuss the importance of determining the method of rescue as soon as possible.
 - a) How much time will it take to set up a rescue/recovery system? The patient's condition is the determining factor.
 - b) What equipment and PPE will be needed?
 - c) Remember - Keep It Simple Sweetheart (KISS).
 - d) Consider the probability of success. Will the chosen strategy and tactics solve the problem?
 - e) What are your on-scene resources? Are sufficient resources and personnel currently available to make strategies and tactics work as planned?
 - f) What are your off-scene resources? What additional time is required for any off-scene resources to respond?

16. Consider the risk to your rescue personnel. Point out that the primary concern is rescuer safety.

Reference: Fire Service Search and Rescue, 7th Edition, pages 27 through 47.

Reference: J&B FF Skills Chapter 5 ICS

Reference: J&B Fundamentals of TR Chapter 3 rescue IM and Chapters 5-11 for each area

17. Discuss formal incident termination criteria.
 - a) Equipment retrieval.
 - b) Abandoning equipment.
 - c) Scene security.

- d) Personnel accountability.
- e) Releasing scene and personnel.
- f) Providing Critical Incident Stress Management (CISD) for rescuers.
- g) Incident critique.
- h) Completion of documentation.

Reference: Fire Service Search and Rescue, 7th Edition, pages 48 and 49.

Reference: J&B FF Skills Chapter 5 ICS

Reference: J&B Fundamentals of TR Chapter 3 Rescue IM and Chapters 5-11 for each area.

APPLICATION

Divide the class into groups and have available pictures of possible rescue sites for the nine rescue disciplines. Have the groups do a site-survey and a needs assessment for a possible response to each of the sites. If the groups have site-surveys that have already been completed for the AHJ; these can be used to enforce the types of hazards.

Using information from the site-surveys/needs assessments and the same pictures with a hazard scenario (fire, wreck, etc.); have the candidates, working in the same teams, complete an initial scene size-up, hazards assessment, and IAP for the scene. Emphasize to the candidates that you want the assessment to include the level of training of personnel that will be involved and where they can contribute.

Other than the site-survey, forms from the NIMS ICS course should be used for this application.

SCENARIOS SUGGESTIONS:

30 to 45 minutes for each scenario.

Rope Rescue Scenarios:

Mountain: A 25 year old inexperienced climber stranded halfway down on rock face, uninjured but trapped and unable to self rescue. Date and time of day: 3:45 P.M., Oct.12, Weather: Current (clear and cool / 52 degrees F.), forecast for next 12 hours: thunderstorms.

Water Tower: A 60 year old painter is trapped inside of tank. There is a possibility of both air contaminates and absorption hazards. Time of day: 9:30 A.M. Weather: Current (Overcast / 85 degrees F.), Forecast for next 12 hours: Thunderstorms.

Water Rescue Scenarios:

Moving Water: Victim has fallen from a canoe during a paddling trip. Victim is 12 years old. Victim does have a Type II Life Preserver from the canoe, but cannot swim. Time of day: 4:30P.M. Air Temperature: 86 degrees F. Water Temperature: 65 degrees F. Next release of water from hydroelectric dam 12 miles upstream at 6:00 P.M.

Ice Rescue: Victim has fallen through the ice on a river 350 ft wide at the point of entry. Victim appears to be approximately 6 years old. Visible clothing appears to be pile jacket with hood. Ice thickness at shore area is approximately 1½ inches thick. Time of Entry: unknown. Time of Report 4:30 P.M. Present Time: 4:40 P.M. Current weather: Snowing, Temperature 34 degrees F.

Structural Collapse Rescue Scenario:

Building Collapse: There is a twelve-story apartment building with a sub-level basement and parking area. There is a possible collapse due to an unknown explosion. There are an unknown number of victims. Current Weather: Misting rain, Temperature 78 degrees F. Forecast: Thunderstorms with heavy rains during late evening and night. Time of Day: 7:30 A.M. Saturday morning,

Vehicle and Machinery Rescue Scenario:

Car and Tractor-trailer MVA: MVA involving a Chevrolet Suburban and a Semi pulling twin trailers. There are four victims in the Suburban and two in the Semi. Location: Median of a six-lane highway. Current weather: Rain and Fog. The temperature is 48 degrees F. Time of day: 12:30 P.M. Dangerous placards on both trailers. The Suburban is partially under the semi and one trailer.

Machinery Rescue: A 58 year old victim is trapped by the arm in a pneumatic roller press. Overload protection is on. The press caused electrical failure to building. Patient has history of heart problems.

Confined Space Rescue Scenario:

Underground Vault: Utility worker collapsed while repairing an electrical motor at a pump station. Eyewitness observed the victim collapse at 2:30 P.M. Current Time: 2:45 P.M. No current permit for site.

Aboveground Agitator Tank: No contact with service worker who entered space on routine maintenance mission. Time entered 10:00 A.M. Current Time: 10:30 A.M.

Trench Collapse Rescue Scenario:

Sewer Replacement Line: Three workers replacing an existing sewer line; collapse of trench wall with accompanying slide of excavator into trench area. One worker visible is from chest up, states that one worker went into pipe. Time of day: 3:45 P.M. Current Weather: 80 degrees. Forecast: possible showers evening and night.

PRESENTATION

ENABLING OBJECTIVE #9

The Technical Rescuer shall correctly identify in writing various consensus standards related to rope rescue and how each standard addresses rope usage fire and rescue incidents.

1. Identify the purpose of the ASTM International standard (formerly the American Society for Testing and Materials).
 - a) An international organization that develops standards through a full consensus method.
 - b) Standards that apply to the rope rescue environment include search and rescue, recreational climbing equipment, and arboriculture equipment.
2. Identify the purpose and discuss the NFPA 1983, Standard for Fire Service Life Safety Rope and System Components, classification criteria for using rescue rope for various rescue operations.
 - a) This standard establishes minimum use guidelines for life safety rope, software equipment such as webbing, accessory cord, and all

hardware like carabiners, and Rescue 8 descenders.

- b) **Technical use**- diameter is 3/8" (9.5mm) - 1/2" (13mm) with a breaking strength of 4500 pounds and a maximum safe working load of 300 pounds.
- c) General-use lifeline - diameter is 1/2" (13mm) - not more than 5/8" (16mm) with a breaking strength of 9000 pounds and a maximum safe working load of 600 pounds.
- d) Escape rope - diameter is 1-9/64" (7.5mm) – less than 3/8" (9.5mm) with a minimum breaking strength of 3000 pounds and a maximum safe working load of 300 pounds (intended only for emergency self-rescue situations).
- e) Throw line - diameter criteria is the same as escape rope with a minimum breaking strength of 3000 pounds.

Reference: NFPA 1983, 2012 Edition, Standard on Fire Service Life Safety Rope and System Components.

- 3. Identify the purpose of NFPA 1951, Standard on Protective Ensembles for Technical Rescue Incidents, 2013 Edition.
 - a) It establishes minimum guidelines for clothing, helmets, gloves and footwear for urban search and rescue activity.

Reference: High Angle Rescue Techniques, 3rd Edition, page 10.

Reference: CMC RRM, 4th Edition, Chapter 4.

SUMMARY

This lesson plan introduces the Technical Rescuer candidate to the various general components of site operations for a rescue situation. It is understood that different rescue disciplines require different operations, strategies and tactics specific to the various rescue disciplines. The instructor must present this lesson plan in a broad-based manner while allowing time for discussion of specific issues relevant to the different rescue situations and disciplines. The continual review and updating of these components before, during, and after an event is imperative to the success of any

operation. Success can be measured in efficiency and safety.

Emphasize the need for a continuous training program in order to function safely and efficiently at any emergency operation, in any rescue environment, involving any rescue discipline.