

Ropes

Lesson One

Victim Management

DOMAIN: PSYCHOMOTOR

LEVEL OF LEARNING: APPLICATION

MATERIALS

IFSTA 7th edition Fire Service Search and Rescue manual; International Manual of Basic Rescue Methods, 2004 edition; High Angle Rescue Techniques, 3rd edition, by Tom Vines and Steve Hudson, available through Mosby / Jems publishing or Firehouse.com. Laptop computer and multimedia projector, white board, marking pens. A suitable number of 1" or 2" flat or tubular design web slings in untied lengths of 6' and 12' or anchor straps of same lengths; several lengths of 7 or 9mm accessory cord including 53" and 65"; 2 - 33' sections of 8 or 9mm accessory cord for rigging a load release hitch; several pieces of 33' - 7mm prussik cord for constructing Purcell prussik; 20 to 25 steel locking carabiners; 2 - 25' and 50' sections of lifeline for tie-back use; various sizes of single and double sheave pulleys; 2 Kootenay pulleys (large drum type); 2 prussik-minded pulleys; several rigging plates; one 1/2" or 5/8" diameter lifeline for highline operations; a sufficient number of lifeline ropes for use in various practical skill evolutions; several 12' to 15' lengths of lifeline for the litter tender (pigtail); slings for the tender (non-litter operation); several spider rigs made with a minimum of 7/16" diameter lifeline, or several commercial type litter harness for use at the head and foot end of the litter; 1 length of 1" untied webbing to be used as a spreader between the two attachment points on the litter; several rope grab devices rated for general use; brake bar racks; Rescue 8 descenders; 2 metal litters and 2 Class III harnesses. Three - 12' long 4" x 4" timbers, a 14' untied 1 3/4" - 2" web sling. Equipment necessary to construct a 4:1 block and tackle system with a change of direction pulley and the necessary lashing lines.

NFPA 1006, 2008 edition JPRs

- 6.1.1 Construct a Multiple-point anchor system
- 6.1.2 Construct a compound rope mechanical advantage system
- 6.1.3 Construct a fixed rope system
- 6.1.4 Direct the operation of a compound rope mechanical advantage system
- 6.1.5 Ascend a fixed rope system
- 6.1.6 Descend a fixed rope system
- 6.2.1 Complete an assignment while suspended from a rope rescue system
- 6.2.2 Move a victim in a high-angle or vertical environment
- 6.2.3 Function as a litter tender in a high angle lowering or raising system
- 6.2.4 Direct a team in the removal of a victim suspended from rope or webbing in a high-angle 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 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 shall correctly demonstrate the various procedures for accessing, stabilizing, packaging, and removing a patient to a safe area from a high and a low angle environment.

ENABLING OBJECTIVES

- 1. The Technical Rescuer shall correctly identify in writing rescue considerations for each phase of the high or low angle rescue incident.

2. The Technical Rescuer , given the appropriate rescue equipment, working as a member of a team, and following local medical protocols, shall correctly discuss the considerations and goals regarding assessing, stabilizing and packaging a patient for safe removal from a rope rescue incident.
3. The Technical Rescuer , given the appropriate rescue equipment and working as a member of a team, shall correctly demonstrate safe and efficient rope rescue methods for gaining access to a patient, and removing the patient from various rope rescue incidents.

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MOTIVATION

The major goal of any high or low angle rescue operation is to gain safe access to the patient, assess the injuries, stabilize and prevent further injuries, package the patient accordingly, and remove the patient to ground level where they can then be transported to a medical facility. In order for these goals to be met, a highly coordinated effort by all rescuers on scene must be demonstrated. Moving rescuers in the high angle environment can be complex and dangerous. These operations require extensive knowledge and practice in order for them to be conducted safely. It is not enough to know only those components of the operation that involve actual rope work. The Technical Rescuer must understand all of the components of a given rope rescue operation. Site operations are crucial to a successful outcome and medical assessment of the patient will often dictate how an operation will proceed. Once access has been made to the patient, proper stabilization of injuries and packaging techniques need to be correctly implemented to prevent further injuries or complications. Then, the safe removal of the patient can be conducted by the most appropriate method. These are the requirements placed upon the Technical Rescuer that performs in the rope rescue environment.

This Lesson Plan is the practical, hands-on portion of the Ropes specialty. There should be discussion and review of Incident Command, PPE, and equipment, but here, the Technical Rescuer should be doing and not just identifying and discussing. Here, the Technical Rescuer is putting together all the knowledge gained from the previous Lesson Plans. Have the students work through the scenarios to become accustomed to the various real-time situations that may arise.

ENABLING OBJECTIVE #1

The Technical Rescuer shall correctly identify in writing rescue considerations for each phase of the high or low angle rescue incident.

1. Point out the fact that for this lesson plan, each phase of rope rescue operations should be considered. It is imperative that the Technical Rescuer be proficient in all aspects of a given operation in order to achieve acceptable results.
2. Discuss the functions to be addressed during Phase I - Assessment on Arrival.
 - a) Primary Assessment includes information gathering, decision-making, and scene control.
 - b) Secondary Assessment includes hazard assessment, identifying current and future resources, assessment of elevation changes, and determining the mode of operation.
3. Discuss the functions to be addressed during Phase II - Pre-rescue Operations.
 - a) Develop the incident action plan (IAP).
 - b) Gather resources such as personnel and equipment.
 - c) Establish a communication network.
 - d) Create the components of the rescue team.
 - e) Identify stabilization and treatment protocols.
 - f) Identify methods for packaging the patient.
4. Discuss the functions to be addressed during Phase III - Rescue Operations.
 - a) There must be patient and rescuer accountability for small and large scale operations.
 - b) Execute the Incident Action Plan for reaching the patient.
 - c) Execute steps to stabilize and treat the patient and package the patient.
 - d) Determine the type of rescue needed to remove the patient from harms way.
5. Discuss the functions to be addressed during Phase IV - Termination.

- a) Identify and collect equipment.
- b) Is there a decision to abandon equipment due to present risk factors?
- c) Is an accident investigation necessary?
- d) Release control of the operation.
- e) Provide critical incident stress debriefing (CISD).

Reference: IFSTA 7th edition Fire Service Search and Rescue, pages 139 through 154.

PRESENTATION

ENABLING OBJECTIVE #2

The Technical Rescuer, given the appropriate rescue equipment, working as a member of a team, and following local medical protocols, shall correctly discuss the considerations and goals regarding assessing, stabilizing and packaging a patient for safe removal from a rope rescue incident.

1. Discuss goals of patient packaging.
 - a) Protect the patient from further physical and environmental hazards.
 - b) Provide for patient comfort.
 - c) Stabilize the patient's whole body to prevent further harmful movement.
 - d) Protect medical equipment that is in the litter.
2. Discuss steps for protecting the patient from the effects of the environment.
 - a) For a cold environment, line the bottom of the litter with a foam pad or blanket, make sure access to the patient from all sides.
 - b) To protect the patient from rain, place a large tarp in the litter as a waterproof barrier, before packaging the patient.
 - c) Apply manual traction if required.
 - d) Apply a cervical traction device and a spinal immobilization device in accordance with the protocol of the AHJ.
3. Discuss the various considerations for patient packaging.
 - a) Package patient in accordance with their injuries.

- b) Conscious and alert patients with no signs of physical injuries may require only minimal packaging such as the life basket with a rescue knot.
 - c) Protect the patient's face and eyes.
 - d) Seriously injured patients will require a basket litter.
 - e) Treat for shock with packaging such as blanketing the patient.
 - f) Provide internal (when needed) and external lashing of the patient in the basket litter.
 - g) Consider the patient's injuries prior to rigging for vertical or horizontal raise or lower.
4. Discuss issues to be addressed when dealing with airway problems.
- a) The patient should be packaged so that they can be rolled to one side in the event of vomiting or other airway problems.
 - b) If intubation, oxygen or intravenous solutions are required, it should be placed prior to moving a litter.
 - c) A suction unit should be placed near the head of the patient.
 - d) The litter tender should wear rubber gloves under the rescue gloved in the event the patient needs to be attended to.
5. Discuss issues concerning cervical spine immobilization.
- a) Most patients suffering from a fall should be suspect of having some degree of cervical injury.
 - b) The method of cervical immobilization should not interfere with the operation off the litter.
 - c) Consider using a spine board designed to fit the litter or a vacuum mattress designed to encapsulate the patient.
6. Discuss issues concerning long bone injuries.
- a) All fractures should be protected with rigid splints and any resulting wounds should be bandaged.
 - b) Patients transported with flexible litters require more precautions to prevent or aggravate injuries.
 - c) Consider using a spine board designed to fit the litter or a vacuum mattress designed to encapsulate the patient.

- d) For femur fractures, use a traction splint that will fit inside a litter such as the Sager splint or the Kendrick's traction splint.

Reference: High Angle Rescue Techniques, 3rd edition, pages 188 through 190, and 217 through 219.

PRESENTATION

ENABLING OBJECTIVE #3

The Technical Rescuer , given the appropriate rescue equipment and working as a member of a team, shall correctly demonstrate safe and efficient rope rescue methods for gaining access to a patient, and removing the patient from various rope rescue incidents.

1. Have the candidates, working as a member of a team, demonstrate rigging procedures for performing a rappel.
 - a) Locate a suitable anchor point and attach a secure anchor system.
 - b) Attach the lifeline.
 - c) The rappeller shall put on a modified seat and chest harness or class III harness.
 - d) The rappeller shall attach a brake bar rack to the lifeline and then clip it into the seat harness.
 - e) The rappeller shall attach the belay line to the modified harness in the appropriate manner.

2. Have the candidates, working as a member of a team, demonstrate rigging procedures for performing ascension.
 - a) Locate a suitable anchor point and attach a secure anchor system.
 - b) Attach the lifeline.
 - c) The ascender shall put on a modified seat and chest harness or class III harness.
 - d) The ascender shall attach a three point ascending system using Purcell prusiks with and without ascending devices.
 - e) The ascender shall attach the belay line to the modified harness in the appropriate manner.

3. Have the ascender ascend the fixed line a distance of 25', and then switch to a rappelling system and descend to the ground.
4. Have the candidates, working as a member of a team, and using an approved litter provided by the AHJ, package a patient in a litter, and rig the litter for making a vertical lower with a litter tender.
 - a) Locate suitable anchor points for the mainline and belay line and attach a suitable and safe anchor system.
 - b) Attach the lifeline and belay line.
 - c) Attach the mainline and belay line lowering system.
 - d) The litter tender shall put on a modified seat and chest harness or class III harness.
 - e) The litter tender shall attach the pigtail system to the mainline system.
5. Have the candidates, working as a member of a team, and using an approved litter provided by the AHJ, package a patient in a litter, and rig the litter for making a horizontal lower with a non-adjusting spider system and a single litter tender.
 - a) Locate a suitable anchor point and attach a secure anchor system.
 - b) Attach the lifeline and the belay line.
 - c) Attach the mainline and belay line lowering system.
 - d) The litter tender shall put on a modified seat and chest harness or class III harness.
 - e) The litter tender shall attach the pigtail system to the mainline system.
6. Have the candidates, working as a member of a team, and using an approved litter provided by the AHJ, package a patient in a litter, and rig the litter for making a horizontal lower with two litter tenders.
 - a) Locate a suitable anchor point and attach a secure anchor system.
 - b) Attach the lifeline and the belay line through the same brake bar rack.
 - c) Attach the mainline and belay line lowering system using adjustable spider rigs.
 - d) The litter tenders shall put on a modified seat and chest harness or class III harness.

- e) The litter tenders shall attach the pigtail system to their respective lifeline.
7. Have the candidates, working as a member of a team, demonstrate rigging a highline system, using an English Reeve system for lowering a rescuer.
- a) Locate two suitable anchor points and construct a highline.
 - b) Rig the tag line system.
 - c) Rig the English Reeve system.
 - d) The rescuer shall put on a modified seat and chest harness or class III harness, and using a short sling clip into the prusik minded pulley on the English Reeve system.
8. Have the candidates, working as a member of a team, demonstrate rigging a tripod for use as a portable anchor and lifting platform.
- a) Using 3 timbers, construct a timber tripod.
 - b) Perform the necessary lashing.
 - c) Attach a ledger system and change of direction pulley at the bottom of the tripod.
 - d) Construct a 4:1 block and tackle system.
 - e) The rescuer shall put on a seat and chest harness or commercial class III harness.
 - f) Attach the block and tackle system and a belay line to the appropriate locations on the rescuer's harness.

APPLICATION

After the Technical Rescuers have practiced the various skills listed in this lesson plan, set up the following scenarios:

The rescuers will stabilize the patient and treat all injuries according to local medical protocol.

Divide the candidates into task groups. Using the following scenarios, have the Technical Rescuers , working as members of a team, demonstrate appropriate patient stabilization and packaging techniques in accordance with each scenario.

If a training tower is not available the instructors should locate a suitable and safe elevated site or sites, to perform the following scenarios. The selected site should be

inspected for existing or potential hazards and mitigate the hazards. Instructors should inspect all potential anchor points for safe use and make sure that all safety concerns for the elevated training location have been adequately addressed. All equipment should be inspected to ensure its safe working order. All personnel shall wear the appropriate PPE at all times.

NOTE: There shall be a minimum of 2 instructors for each scenario being conducted. The instructors may elect to use a third instructor on a safety line for the vertical rescue scenarios to assist with problems that may arise. Scene safety must be assured prior to commencing training operations. The entire class will participate with the instructors acting primarily as the overall Safety Officer. Safety is paramount; therefore at any time during the exercises, if the instructors observe any situation needing correction, all operations will stop until the corrections are made. The instructors shall appoint an Incident Commander for each exercise and rotate all class personnel through the various positions required for these types of operations. These scenarios should be conducted as actual rope rescue operations with considerations given to all aspects of site operations. All personnel shall wear the appropriate PPE at all times and all verbal commands will be utilized in each scenario. It is also suggested that a rescue mannequin or fire hose dummy be used instead of a person in all exercises except for the pick-off scenario. For all scenarios, a back-up belay line system should be used.

Advise the candidates they must address the following points while performing the scenarios listed below.

1. Scene size-up.
2. Establish command.
3. Stabilize the scene and the area where the patient is located.
4. Establish hazard zones.
5. Appoint appropriate sector officers.
6. Have safety officer monitor all tactical operations to ensure all implemented procedures are safe.
7. Have the safety officer or rigging officer inspect all rigging before moving the patient on the system.
8. Provide protection for patient and rescuers.

9. Rotate the teams through as many scenarios as possible.

Scenario 1: Patient Pick-Off

Objective: Access a patient in an elevated location that is suspended from the end of a lifeline. The patient is wearing a class II harness and appears to be semi-conscious and has a gash over the right eye with profuse bleeding. Provide medical treatment and package the patient according to local medical protocol. Rescue operations will be conducted from a position located above the patient with the patient lowered to ground level.

Scenario 2: Vertical Lower with an Attendant

Objective: Access a patient atop an elevated location. The patient is unconscious and has no discernable internal or visible external injuries. Patient is experiencing moderate to severe respiratory distress. Provide medical treatment and package the patient in accordance with local medical protocol and transport to ground level.

Scenario 3: Horizontal Lower with an Attendant

Objective: Access a patient atop an elevated location. The patient is complaining of severe back pain and numbness of lower extremities. Provide medical treatment and package the patient for spinal injury in accordance with local medical protocol and transport to ground level.

Scenario 4: Angled Highline Lower

Objective: Access a patient atop an elevated location. From that elevated location (not to exceed 30' in height), there is no place at ground level for a direct vertical lower. The lower must extend away from the base 50' to 75'. The patient has fallen from a scaffold to a flat roof. The right shoulder appears to have dislocated and there are multiple abrasions on the right arm. Provide medical treatment and package the patient in accordance with local medical and transport to ground level.

Scenario 5: Horizontal Highline Lower

Objective: A climber has sustained a fall while climbing up from a ravine. The climber is lying on a large ledge, 30' x 30'. He has sustained a broken left leg and possibly broken ribs on the left chest. He has moderate respiratory distress. The quickest exit out of the area is across the ravine, which spans a distance of approximately 100'. Where an EMS unit is standing by. Provide medical treatment and package the patient for a horizontal crossing. Set up a highline system using a litter.

Scenario 6: Vertical Raise

Objective: A telephone repairperson has fallen approximately 10' while descending a ladder into a manhole. The patient is conscious and complains of a broken left leg. Set up a portable anchor tripod. Access, treat and package the patient for a vertical raise out of the manhole.

SUMMARY

This lesson plan is a culmination of the learning process regarding high and low angle rope rescue operations. It has been designed to allow Technical Rescuers to practice the proper patient care, stabilization and packaging techniques that are so crucial to the survivability of the patient. By challenging the Technical Rescuers with these types of scenarios, skills proficiencies can be evaluated and corrected in a controlled environment thus increasing a patient's chance of recovering from injuries sustained from an actual high angle accident. The hands-on training is designed to expose the Technical Rescuer to the various types of rope rescue incidents that they may encounter. The Technical Rescuer has also been required to use all of the components of Site Operations as well. This lesson should have been conducted as close to actual rope rescue operations as possible, hopefully providing the Technical Rescuer with a realistic perception for the requirements of future operations.