Pocono Search and Rescue
Standard Operating Procedure
Rope Rescue Operations

Procedure No. 404.01
Adopted: 1/1/2005
Revised:

I. PURPOSE
The purpose of this procedure is to establish guidelines for conducting high angle/rope
Rescues. Because of the infinite number of potential sites and situations that could be
Encountered, this procedure will not define a specific evolution to use, but will give
Guidelines to follow for conducting safe and effective operations.

II. DEFINITION
Rope rescue is defined as any rescue attempt that requires rope and related equipment to
Safely gain access to, and remove patients from, hazardous geographic areas with limited
Access such as steep embankments, high rise buildings, above or below grade structures,
By means of rope system. Rope rescues are divided into two general categories; non-
technical and technical.
Non-technical evacuations are those of less than 40 degree inclination. Technical
Evacuations are considered those from 40 degrees to 90 degrees. Technical evacuations
Require the dispatch of the Pocono Search and Rescue and mutual aid rescue teams.

III. STANDARD OF RESPONSE
Upon receipt of a high angle rescue call, Pocono SAR shall request Monroe County
Communications to dispatch Station 76 and Station 77 for mutual aid. If more resources
are needed, the Incident Commander or PSAR Officer will request additional rescue
teams and/or fire department units.

IV. TACTICAL CONSIDERATIONS
A high angle rescue incident is best organized into four phases. The first phase involves
Fire personnel arriving on scene, initiating command, and performing a size up. The
Second phase includes pre-rescue operations to prepare fire personnel for victim removal.
The third phase includes rescue operations and victim removal. The fourth phase
Involves termination of the incident.
V. SIZE UP
The first phase involves fire personnel arriving on scene, initiating command, and performing a size up. The following procedures should be followed when performing phase one of a high angle rescue.

Arrival on Scene
1. First arriving company officer should take Command and begin an immediate size-up of the situation.
2. Secure responsible party or witness. Command should secure a witness as soon as possible after arriving on scene. This will help in identifying the problem and locating the victim.
3. Locate the victim. In most cases, Command will have to send a recon team to the area of the victim to determine the exact location of victim and nature of injuries. Command may wish to designate this as **Recon Group**. **Recon Group** should have EMS equipment to begin to administer the first aid to the victim. If the terrain is greater than 60° inclination, Command may decide to wait until the SART arrives with the proper equipment to reach the victim.
4. Assess the need for additional resources. **Recon Group** should provide Command with enough information, or recommend the need for additional resources. Information that will be helpful in determining the need for additional resources would be: number of victims, location and condition of victims, estimated angle of terrain, distance to victim, and estimated time of extraction. Command should put in an early call for additional resources. If additional resources are not needed after a call has been put in, Command can return those units to service.
5. Assess the hazards. Command may wish to designate a **Safety Officer** to identify all potential hazards to rescuers. **Safety Officer** will be responsible for securing those hazards or making all members aware of those hazards. **Safety Officer** shall also be responsible for assuring that all safety procedures are adhered to.
6. Decide on rescue or recovery. **Recon Group** should advise Command whether the operation will be conducted in the rescue or recovery mode. In the rescue mode personnel assigned to Recon Group will be reassigned to Rescue Group and Recon Group will be terminated. If the operation is to be conducted in the recovery mode, Command may wish to leave the victim and any related equipment in place for investigative purposes.
7. Decide on an action plan. With the recommendation from **Rescue Group**, Command will have to decide on an action plan. **Rescue Group** and **Safety Group** shall be made aware of the specific action plan. Deployment of the SART personnel in the Action Plan needs to be monitored by Command to ensure trained SART members are available to staff critical functions.
Dependent on the incident, these would be in the following areas:
1. Rescue Team involving Rope rescue, and any climb requiring technical skills and/or training. SART should include a Paramedic when possible.
2. Support requires one trained SART member at Rescue Apparatus to obtain any additional equipment or support items for the rescue team.
3. Liaison will provide technical capability to Command, especially when operation involves other agencies. This function can usually be filled by the Special Operations Officer responding to the call.

VI. PRE-RESCUE OPERATIONS
The second phase involves fire personnel preparing to conduct the rescue. Phase two includes making the general area safe, making the rescue area safe, and establishing a Rescue Group. The following procedures should be followed when performing phase two of a high angle rescue.
1. Make the general area safe. Command or his/her designee should begin to make the general area safe. This may include securing the area and not allowing civilian personnel into the area.
2. Make the rescue area safe. Command or his/her designee should make the immediate rescue area safe. This may include removing all civilian personnel and all non-essential rescue personnel from the area. If it is not possible to secure all the hazards in the immediate rescue area, all personnel operating in that area shall be made aware of those hazards.
3. Decide if it is a pre-rescue or recovery situation. Depending on the action plan established, Command may want to establish a Rescue Group. Rescue Group will be responsible for gathering all equipment and personnel necessary to operate according to the action plan. Rescue Group will assign rescue personnel to conduct the rescue, and support personnel to support the rescuers, during the actual rescue phase. Rescue Group should have an alternative action plan should the first choice plan fail. This alternate plan should be communicated to all personnel operating in the rescue area.
4. Consider ambient conditions. Extreme heat or cold will require more rescuers. Consider the affects of rain or snow on the hazard profile. Plan for sufficient lighting for operations extending into the night.
5. Consider the affect on family and friends. Keep the family informed of operations.
6. Assign a Public Information Officer to handle the news media.
VII. RESCUE OPERATIONS

After pre-rescue operations are complete, Rescue Group shall put forth the action plan removal of the victim(s). Rescue operations should be conducted with from low risk to high risk. Rescues should be conducted with the least amount of risk to rescuers necessary to rescue the victim. Low risk operations are not always possible but should be considered first. If the rescue of the victim(s) is only possible by means of a high risk operation, Rescue Group shall communicate with Command the risk/benefit of the operation.

The order of rescue from low risk to high risk would be:

**Talk the Victim Into Self Rescue**

If the victim is not exposed to a life threatening situation, it may be possible to talk the victim into self-extrication. If the victim is exposed to a life threatening situation, it may be best to advise the victim to stay in place until a rope rescue system can be set up.

**Low Angle: Assist the Victim**

For terrain less than 40 degree inclination, (non-technical) most first responders have the equipment and training to assist the victim down. If the victim is ambulatory, he/she can walk down with the assistance of rescuers.

**Low Angle: Victim in Stokes Basket**

If the victim is injured or unable to assist in their own rescue, he/she should be packaged properly in a stokes basket and carried to safety. The stokes extrication should be conducted with a minimum of 4 litter bearers. Bearers should face the direction of travel during the extrication. If appropriate, a tag line should be attached to the litter for assistance through unstable areas.

**Steep Angle: Assist the Victim**

For terrain of greater than 40 degree inclination, the SART shall be called in to assist with the extrication. If the victim is ambulatory, he/she may be assisted down by rescuers with the use of a belay/tag line. If appropriate, rescuers should set up an anchor system for the belay. A body belay may also be used by rescuers, if appropriate.

**Steep Angle: Victim Evacuation**

If the victim is not ambulatory, rescuers shall build an anchor system and prepare for a steep angle evacuation. The patient shall be packaged properly in a litter and prepared for the extrication. There shall be at least 3 litter attendants assisting with the litter evacuation. Attendants should face the anchor during the evacuation and be clipped into the litter. A separate raising/lowering line and belay line shall be set up for raising or lowering during steep angle evacuations.

**High Angle: Victim Evacuation**

For evacuations greater than 60 degrees, the SART shall conduct the evacuation. Evacuations greater than 60 degrees are considered high angle operations. The Rescue Group officer, in conjunction with the Safety Officer, should decide the most appropriate method to extricate the victim. This may include putting the victim(s) in a harness and raising or lowering them, or packaging them in a litter for the raising and/or lowering.
In any case, a 15:1 safety factor shall be maintained and a double rope technique shall be used if at all possible. If possible, a separate anchor should be used for the working line and the belay line. Proper care shall be taken to assure that the victim will not come out of the harness or litter used to extricate him/her. Which ever method of extrication is used, the Rescue Group officer shall ensure the overall safety of the raising/lowering system. Rescue Group shall designate the tasks of individual rescuers during the operation.

VIII. TERMINATION
Command shall begin termination as soon as feasible after the removal of the victim. This shall include securing all of the equipment used for the rescue/recovery, and any evidence that will be necessary for an investigation. This may include witnesses, photos, victim's personal affects or equipment involved in the accident. At this time, Command can turn the scene over to the responsible party of the police department. Command should consider activating the C.I.S.D. Team for any extraordinary type of incidents.
1. Maintain personnel accountability
2. Maintain equipment accountability. If there has been a fatality, Extrication Group may consider leaving tools and equipment in place for investigative purposes.
3. Re-stock vehicles
4. Consider debriefing
5. Secure the scene
6. Return apparatus and personnel to service

IX. ROPE RESCUE EQUIPMENT
This procedure establishes guidelines for the use, care, maintenance, and storage of rope and related rope rescue equipment.

General Cautions When Using Rope Rescue Equipment
1. Make sure all knots are tied and dressed correctly.
2. Maintain at least 15:1 safety margin when not belayed.
3. Belay loads when safety margin is less than 15:1.
4. Rescuers shall not operate with less than a 10:1 safety margin.
5. Rescuers shall not approach an edge without being tied in and communicating with rescuers below.
6. Rescuers shall place victims in harness during rope borne rescues.
7. Rescuers shall wear appropriate clothing:
   A. for steep or high angle rescue
   1. Seat and chest harness
   2. Helmet
   3. Approved hiking shoes or boots
   4. Self-rescue gear
   5. Safe cutting device
   6. Eye protection
   7. Gloves
**Rope**

*Uses*
Rope can be used as a rappel line, lowering line, safety belay, litter tag line, or in mechanical advantage pulley systems. It is not intended to be used as a tow rope, utility line, etc. This is to be considered a life safety line only. The rescuer's life as well as the victim's may depend on it.

*Construction*
Rope is made of nylon, low-stretch kernmantle. It has an inner core and an outer sheath. The outer sheath protects core. 75%-85% of the ropes strength comes from the core, depending on manufacturer.

*Specifications*
Rope diameter is 1/2" (12.7mm). Rope strength is 9,000 pounds and loses approximately 15% when wet. Standard rope lengths are 100 feet. However, rescue companies may have up to 600 feet lengths of rope.

*Maintenance*
Inspect the rope visually after each use for damage to sheath, dirt or mildew, and soft spots in the rope core. Find soft spots by "running" or pulling the rope between thumb and index finger. Wash rope when dirty.

*Core*
Wash with mild nonchlorine-based detergent and water. Hang loosely and allow to air dry out of direct sunlight. Once rope is dry, it is stuffed, not coiled, in rope bag and stored in a dry, dust-free place, where not exposed to chemical (petroleums, alkali’s) and direct sunlight.

*Cautions*
NEVER walk or stand on the rope. Don't drop rope from great heights when it can be carried down. Don't drag rope across ground or apparatus bays. Pad all edges. Avoid nylon passing on nylon; i.e., rope passing over itself, another rope or webbing. Keep all rope and webbing material out of petroleum and alkaline products, and if forced to use in applications where contamination will occur (around wheels, axles, etc.), retire after use.

**Webbing**

*Uses*
Webbing can be used for anchor slings, gear slings, harness, and lashing.

*Construction*
Webbing is made of Nylon, and is woven three different ways: spiral weave, tubular, or flat.

*Specifications*
Most webbing is one inch wide. It has a strength of 4,000 pounds.

*Maintenance*
Maintain webbing the same as rope.

*Care*
Same as rope.

*Cautions*
Same as rope.
Accessory Cord

*Uses*
8 mm loops of accessory cord (AC) can be attached to a host rope by a prusik hitch to form attachment points for pulleys. Long loops of 6 mm AC can be tied to allow their use as "soft" ascenders to climb a host rope.

*Construction*
Accessory cord is made of Nylon, low stretch, kernmantle.

*Specifications*
Accessory cord diameter may vary from 6 mm to 9 mm, depending on application.

*Maintenance*
Same as rope.

*Care*
Same as rope.

*Cautions*
Same as rope.

Carabiners

*Uses*
Carabiners are used to link various pieces of gear together, or to add friction to a system.

*Construction*
There are two types of construction for carabiners: locking, steel, pin type, not lock sleeve dependent, or locking, aluminum, pin type, not lock sleeve dependent.

*Specifications*
Steel carabiners have a 9,000 pounds breaking strength. Aluminum carabiners have a 5,500 pounds breaking strength.

*Cautions*
Keep carabiners clean. Don't drop or throw carabiners. Load only in the long axis, no side loading. Don't forget to lock the gate. Inspect carabiners for cracks, worn spots, and smooth operation.

Pulleys

*Uses*
Pulleys are used to reduce friction, to change direction, or to gain mechanical advantage.

*Construction*
Pulleys are constructed of sealed ball bearing, anodized aluminum or steel sides.