**LOW ANGLE ROPE RESCUE SOG**  
6/12/2014

I. **DEFINITIONS**

*LOW ANGLE ROPE RESCUE*: Low angle rope rescue refers to a rescue environment in which the on rope rescuers are supported predominately by the rescuers themselves and not by the rope rescue system.

II. **OPERATIONS**

<table>
<thead>
<tr>
<th>A. KEYS TO INCIDENT RESOLUTION</th>
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<tbody>
<tr>
<td>1. <strong>PROVIDE A SAFE MEANS TO STABILIZE AND REMOVE VICTIMS</strong></td>
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<tr>
<td>• Rapid investigation to determine the location and scope of the incident.</td>
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<td>• Rapid deployment of initial rescuer to assess and stabilize victims and provide information to assist in formulating a rescue plan</td>
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<td>• Provide for additional resources as needed based upon the situation and rescue plan</td>
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<td>• Provide for appropriate medical treatment and transportation of victims</td>
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<td>2. <strong>ENROUTE CONSIDERATIONS</strong></td>
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<td>• Travel route based on time of day, other responders, street closures, etc.</td>
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<td>• Additional resource needs based upon supplemental information</td>
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<td>• Apparatus location and best access</td>
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<td>• Apparatus spotting (Provide anchors, haul field, edge concerns)</td>
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<th>B. FIRST ON SCENE - SUMMARY</th>
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<td>1. <strong>SIZE UP:</strong></td>
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<td>Make a clear and concise size-up that provides a description of the type and severity of conditions present, the location of conditions and the actions being taken. Example: “E28 is on scene of a two vehicle traffic collision, one vehicle is over the side approximately 150 feet down the embankment. E28 will be sending a rescuer over the side to investigate.”</td>
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<tr>
<td>a. Determine the number of victims, nature and extent of injuries, additional hazards present, and any environmental concerns.</td>
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<td>b. Consider the need for additional specialized resources (US&amp;R, Air Ambulance, GPD, Etc.) and request early</td>
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<td>c. Make additional assignments to incoming companies until relieved of command or command is passed.</td>
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2. **RESCUER AND VICTIM SAFETY- CONSIDERATIONS:**

   a. A two rope system (mainline and belay) should be deployed in any situation where a victim rescue is anticipated.
   b. Consider overhead hazards such as loose rocks, scree, soils or other objects that could be dislodged and injured victims or rescuers.
   c. Poisonous plants, snakes, spiders, ticks.
   d. Environmental conditions such as rain, snow cold or heat.
   e. Vehicle traffic.
   f. Uneven or unstable terrain.
   g. Ensure to pre-tension all system components prior to utilization.

3. **LOW ANGLE RESCUE ICS ORGANIZATION CHART**

   ![Organization Chart Image]

   **C. ICS POSITION RESPONSIBILITIES**

   **Incident Commander (IC)**

   - Responsible for the overall management of the incident.
   - Assess the situation and/or obtain a briefing from the previous IC.
   - Determines and communicates incident objectives and strategy.
- Establish the immediate priorities
- Ensure personnel safety and personal incident accountability
- Communicate as needed with dispatch or emergency command center

**Safety Officer**

- Identify hazardous situations associated with the incident
- Develop and recommend measures for assuring personnel safety
- Stop or prevent any unsafe act.
- Should be competent rope rescuer to safety-check and oversee rope rescue operation.
- When staffing is limited, personnel can safety-check each other’s work.

**Rescue Group Supervisor**

- Assigns personnel to positions as needed
- Supervises activities related to the actual rescue operation
- Supervises rigging, haul, and litter team leaders
- Ensures safety checks are performed as needed
- Acts as edge person until edge position is assigned
- Acts as communication link between rescuers and riggers

**Rigging Team Leader**

- Lead Rigger
- Supervises rigging set up and operation of rope systems
- Ensures safety checks are completed

**Mainline / RPM tender (Rigging Team)**

- Sets up RPM system
- Operates rope and friction device to lower rescuer down the slope
- Oversees operation of mechanical advantage haul system
- Determines needs for change of direction or additional rope systems

**Belay Tender (Rigging Team)**

- Sets up belay system
- Operates belay system

**Haul Team Leader**

- Oversees operation of mechanical advantage haul system
- Controls mainline during raising operations along with other haul team members
Litter Team Leader

- Oversees operations including victim packaging and extraction
- Safety checks rescuer and victim attachment to litter

Initial Rescuer

- Accesses and stabilizes victims (Ambulatory and Non-ambulatory)
- Assesses victims condition and advises rescue group supervisor of best rescue operation
- Secures victim in litter
- Carries litter upslope as part of litter team
- Walks out ambulatory victim

Additional Rescuers (Litter Team)

- Help assess victims condition
- Secures victim in litter
- Carries litter upslope

Medical Group

- Assesses victims condition
- Accepts victim when victim reaches top of slope
- Un-packages victim and coordinates transport
- Primary and Secondary Assessment
D. OPERATIONS

1. **TANDEM PRUSIK BELAY**

- Used to ensure safety of rescuer and victim in case of a catastrophic failure or human error
- Designed to catch load during failure of mainline
- If placed under load accidentally, tighten any slack in the mainline and transfer load by unwrapping the load releasing strap until load is completely held by the mainline
- If placed under load due to a catastrophic failure, replace component that failed and tighten mainline, then transfer load by unwrapping the load releasing strap until load is completely held by the mainline

**CONSTRUCTION**

a. Establish an appropriate anchor. Anchor should be in line with the main line anchor to prevent a pendulum action if the main line fails.
b. Attach tandem prusik belay to anchor using appropriate length of webbing
c. Attach prusiks to belay line as shown
LOWERING OPERATION
a. Keep load releasing strap tensioned to minimize shock load in case of mainline failure
b. Maintain a slight slack (less than 2 feet) on rope while sliding rope through prusiks as shown

RETRIEVAL OPERATION
a. With one hand, grasp the line on the side opposite the tandem prusiks 2 feet below the pulley.
b. With the other hand, grasp the line on the same side of the pulley a comfortable distance away from the first hand.
c. Pull the line hand over hand away from the anchor.
d. The line must be maintained at 180 degrees in and out of the prusik minding pulley. Prusiks must ride squarely on the bottom edge of the pulley. Prusiks that are allowed to ride up the side of the pulley may jam or be damaged.
e. When the direction of travel reverses, the prusiks will set.
2. **MAINLINE SYSTEM**

- As the name denotes, this is the primary line in any rope system. Basic lowering operations and in line mechanical advantage systems will be accomplished off the main line. This line will be loaded during lowering and/or raising operations.
- Mechanical advantage systems with a directional change require additional equipment and staffing. This includes both in line and piggy back systems.
- The haul team leader will direct the construction of the mechanical advantage system and direct the haul team.
- Apparatus positioning is very important. Proper positioning of the apparatus will ensure a safe and adequate working area for personnel and maximize the effectiveness of the mechanical advantage system.
- The apparatus shall NOT be used in the raising of the rescuers.

**CONSTRUCTION (LOWERING OPERATION)**

a. Establish an appropriate anchor.

b. Attach RPM to anchor using appropriate length of webbing

c. Reeve mainline through the brake bar rack. Use a minimum of four bars for a single rescuer, five bars for two or more rescuers.

d. Optionally, at the discretion of the rigging team leader, a tandem prusik brake may be established on the mainline prior to lowering the rescuer.

e. One member is required to tend the descent control device (brake bar). If the optional lowering line brake is used, a second member is required to tend the brake.

f. Once the rescuer has been lowered and is in position, tie off the mainline or set the mainline brake (if used) and prepare to change to a raising system. Refer to the end of this SOG for instruction on tying off the mainline.
CONSTRUCTION (RAISING SYSTEM)

Once lowering operations are complete, the rescuer and victims most often must be pulled back up the incline to a safe area. This is accomplished by utilizing a mechanical advantage haul system. If the distance between the main line anchor and edge is adequate, an inline mechanical advantage system should be used. Adequate distance will provide the hauling team a safe area to work in line toward the incident and must be long enough to minimize the number of resets necessary to complete the raising operation.

a. Attach prusik(s) to the mainline if not previously attached during the lowering operation.
b. Set the prusik brake.
c. Remove the mainline from the descent control device (brake bar).
d. Install the mainline through the prusik minding pulley.
e. Establish the necessary mechanical advantage system (3:1, 5:1, 9:1)
f. Coordinate retrieval of the rescuers and victims between the haul team, belay tender and rescue team.
3. **CMC VICTIM RESCUE HARNESS**

The CMC Pro Series Victim Rescue Harness was designed to properly rescue and secure a victim quickly and efficiently in both low angle and high angle environments. This SOG will cover the use of the harness in both ambulatory and non ambulatory low angle rescue scenarios. Practice and experience will allow you to modify the steps for unusual situations.

**Operation for an AMBULATORY Patient**

The CMC Victim Harness consists of a red chest harness and a blue bag containing an integrated Class II waist harness. Two additional carabiners and a set of prusiks (one long red prusik and one short green prusik) should accompany the victim harness. The chest harness is available for use at the discretion of the rescue group supervisor. It is anticipated that in the majority of low angle rescue scenarios, the chest harness will not be necessary. *See Figure 1.*

![Figure 1](image1)

For a more efficient operation the prusiks should be pre-attached to the main line and the belay line before the rescuer begins his descent. A second option is to expose the orange gathering loop on the waist harness and pre-attach the carabiners to the harness, letting the harness hang from the rescuers main line connection. *See Figures 2.*

![Figures 2](image2)
The rescuer should approach the patient from the top or the side of the patient to eliminate any potential of the patient trying to jump for the rescuer or the rope. The rescuer should calm and reassure the patient at all times and explain what the rescuer will be doing and what the patient needs to do.

Once the rescuer has approached the patient, remove the waist harness from the bag. The label marked ‘patient’ should be placed against and facing the small of the patients back. See Figure 3. Secure the black strap around the patient’s waist, leaving the orange loop at the patient’s navel with the red and blue leg straps hanging in front of the patient’s legs.

If the carabineers were not pre-attached to the harness, attach the prusik from the mainline to the orange loop to ensure the patient is “captured” and cannot fall any further. See Figure 4.

Attach the prusik from the belay line to the orange loop as well to ensure patient is on the belay line. After the patient is secured to the main and belay lines, capture the patient’s legs by running the red and blue straps between the patient’s legs and around the outside to the front buckles. See Figure 5.
Check for the following:

a. The V-rings are securely clipped into each snap.
b. The harness is snug and not pinching or binding.
c. The snaps are not causing the victim any discomfort.
d. The victim’s carabineer’s is locked.
e. There is no slack in the system

Once the patient is attached to the main line and belay, the rescuer can adjust the prusiks so the ambulatory patient is directly in front of the rescuer and the rescuer is in a supporting role for the ascent. See Figure 6.

Note:

If you have multiple ambulatory victims, you will need to bring additional prusiks, carabineers and blue webbing. The blue webbing can be converted into a hasty harness and be applied to the additional patients. The additional patients would be attached the same way to the main line and belay utilizing the prusiks.
Operation for a NON-AMBULATORY Patient

The CMC Victim Harness is located in a small blue bag. The blue bag should be accompanied by (2) additional carabineers and a set of prusiks (one long red prusik and one short green prusik). In addition, the rescuers will need (2) 12’ yellow webbings and (1) 20’ red webbing for this operation. The rescuers may choose to remove the carabineers and prusiks from the rescue harness as they will not be used for this operation. See Figure 7.

![Figure 7]

Attach victim harness to the non-ambulatory patient the same way you would for an ambulatory patient. Attach victim harness prior to securing patient to backboard if possible. Once patient is secured to backboard, place patient in stokes basket. For the interior lashing, use two (12’) yellow webbings to secure the patient to the stokes basket. Wrap webbing around orange loop with a girth hitch and run webbing towards head and secure to main member of stokes utilizing the round turn and two half hitch method. Wrap second webbing around black waist strap with a girth hitch and run webbing towards feet securing to main member of stokes utilizing the round turn and two half hitch method. Continue with standard exterior lashing method. If there is no victim harness, secure the victim in the stokes basket with the chest and pelvic harnesses and continue with the standard exterior lashing method. See Figure 8.

![Figure 8]
4. **LOW ANGLE LITTER RIGGING**

**CONSTRUCTION**

a. Attach gathering plate to stokes basket using a green (5’) webbing and carabineer as shown below. Keep webbing away from middle welds on stokes.
b. Attach bridles to the gathering plate using the outside holes as shown.
c. Attach mainline and belay to the gathering plate using the large hole. Secure all carabineers.

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**STOKES BASKET SET UP - THREE LITTER TENDERS**

a. Remove mid-line knot from one of the bridles.
b. Attach bridles to outside holes of gathering plate.
c. Use a single carabineer to support extended bridle along the side of the basket
d. All tenders attach to both the figure eight and the prusik.
e. Tenders use the prusik to adjust positioning.
f. Litter tenders should support the load and let the haul system do the work. Do not try to walk the patient out.
STOKES BASKET SET UP - FOUR LITTER TENDERS

a. Remove mid-line knot from both of the bridles.
b. Attach bridles to outside holes of gathering plate.
c. Detach the prusik loop from the bridle carabineer at the gathering plate and slide the prusik down the bridle to the shoulder of the litter.
d. Tenders at patient shoulder level attach to prusik only.
e. Tenders at patient knee level attach to both the figure eight and the prusik.
f. Tenders use the prusik to adjust positioning.
g. Litter tenders should support the load and let the haul system do the work. Do not try to walk the patient out.

LITTER TENDER OPERATIONS – KEY POINTS
a. The victim, number of personnel available, slope and terrain features will determine the need for either three or four rescuers.
b. All tenders should support an equal part of the load.
c. Litter tenders should lean back slightly while supporting the stokes and allow the system to haul the load rather than trying to assist by climbing forward.
d. Ensure all carabineers are locked prior to ascending with the victim.
e. Rescuers should not attach themselves to the stokes basket. Attach to the bridles only.

INTERFACING WITH HELICOPTERS

LAFD
- For liability reasons, LAFD strictly uses their own stokes for rescue operations
- For Victim removal (Non-Ambulatory)
  - Outside agency’s backboard & spiderstrap & NO stokes basket is the operation of choice
  - Fly crew leaves patient strapped to outside agency’s board
  - **NO OUTSIDE AGENCY STOKES – because LAFD Flight Crew uses their OWN stokes basket.**
  - Leave the patient where they lie (unless too difficult to lower a Stokes via LAFD’s helicopter)
  - Flight crew lowers a rescuer with a self contained stokes & webbing down to the patient
  - Flight crew takes victim on backboard and loads victim into LAFD’s stokes

AIR 5 - Sheriff
- AIR 5 – lowers their own rescuer and stokes, like the LAFD
- In a pinch (i.e. – MCI, MVI or time constraints) AIR 5 will use outside agency’s stokes for transport
  - If patient is packaged with outside agency’s stokes and lashing – AIR 5 will load & go

LACoFD
- LACoFD strictly uses their own Bauman Bag on all helicopters
- LACoFD does not use an outside agency’s stokes for liability reasons
- For Victim removal (Non-Ambulatory)
  - Outside Agency’s Backboard & Spiderstrap or Miller board (if C-spine Criteria) & NO stokes basket is the Operation of choice
  - Fly Crew leaves Patient strapped to Outside Agency’s board (Miller or Backboard) & Full C-Spine (if required)
  - **NO OUTSIDE AGENCY STOKES – LACoFD uses the BAUMAN BAG**
  - Flight Crew drops a Bauman Bag & Webbing down to Victim
  - Flight Crew takes Pt on Backboard or Miller board & loads Victim into LACo’s Bauman Bag
First Arriving Engine Company
Engine Company Officer: IC, Rescue Group Supervisor, Edge person
1. Performs size-up
2. Gives direction
3. Reports C.A.N. (Conditions, Actions, Needs)
4. Establishes Command and names incident
5. Assigns tactical channel
6. Determines need for additional resources
7. Will become Rescue Group Supervisor/Edge Person once command is passed off to first arriving Battalion Chief
8. Can also pass off Edge Person role to become solely Rescue Group Supervisor

Engine Engineer: Belay tender
1. Positions apparatus
2. Secures scene
3. Constructs Belay system
4. Performs safety check on rope system
5. Reports to Rigging Team Leader

Engine Firefighter: Mainline/RPM tender
1. Constructs mainline and RPM system
2. Performs safety check on rescuer
3. Performs safety check on rope system
4. Reports to Rigging Team Leader

Engine Firefighter/Paramedic: Initial Rescuer
1. Secures medical equipment
2. Performs patient assessment and need for additional resources
3. Determines if patient is ambulatory or non ambulatory

NOTE: ALL RESCUE PERSONNEL ON SCENE SHOULD BE IN A CLASS 3 HARNESSES

First Arriving Truck Company
Truck Company Officer: Safety Officer/Rigging Team Leader
1. Reports to IC initially
2. Reports to Rescue Group Supervisor once assigned
3. Supervises rigging team
4. Coordinates with Litter Team leader
5. Can also function as Edge person once rigging is in place

**Truck Engineer: Additional Rescuer/Litter Team Leader**
1. Responsible for Litter Team Operations
2. Ensures safety of Litter Team
3. Coordinates with Rigging Team Leader
4. Reports to Rescue Group Supervisor

**Truck Firefighter: Additional Rescuer**
1. Sets up litter for 3 or 4 rescuer team
2. Member of Litter Team
3. Assists with patient packaging

**Truck Firefighter: Additional Rescuer**
1. Sets up litter for 3 or 4 rescuer team
2. Member of Litter Team
3. Assists with patient packaging

**Second Arriving Engine Company**

**Engine Company Officer: Haul Team Leader/Safety Officer**
1. Sets up Haul Team
2. Coordinates with Rigging Team Leader
3. Safety Officer

**Engine Engineer: Haul Team/Rigging Team**
**Engine Firefighter/Paramedic: Haul Team/Rigging Team**
1. Can act as Medical Group Supervisor

**BLS Ambulance**

**Medical Group**
1. Performs medical assessment
2. Un-packages patient(s)
3. Transports patient(s)
4. Reports to Medical Group Supervisor

**First Arriving Battalion Chief**
1. Assumes Command
2. Receives situation status/resource status from initial IC
3. Incident objectives, priorities and progress.
4. Conditions, Actions, and Needs
TYING OFF THE BRAKE BAR RACK

Figure 10-48. Form a Bight