Technical Rope Rescue Field Guide

Access Rescue Canada

Introduction to the Field-Guide

This *Field-Guide* may be used by qualified personnel as an adjunct to Operational Guidelines, procedures and policy. It is a reference only and is not a comprehensive or prescriptive approach to technical rope rescue.

Safety

The officer in charge, rope technician and each rescuer must ensure that all relevant procedures and policy are integrated into both training and emergency response.

A Rope System that is determined to support a life-load shall utilize a two-rope system. One rope is used for the descent control device, lowering, and subsequent raising of rescuer and patient, and is otherwise known as the *working line*. The other rope is used as a belay line. This line holds no load; it is there to arrest a potential fall of the load.

Each rescuer, supported by the system, shall be connected to the *main line* and a *belay line*. In the event that either the main line or belay line becomes ineffective, the rescue operation is held until the appropriate line is replaced, checked, and approved by the Rescue Sector Officer or Safety Officer.

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Responding to a Technical Rope Rescue

Integrate pertinent pre-planned information with the following:

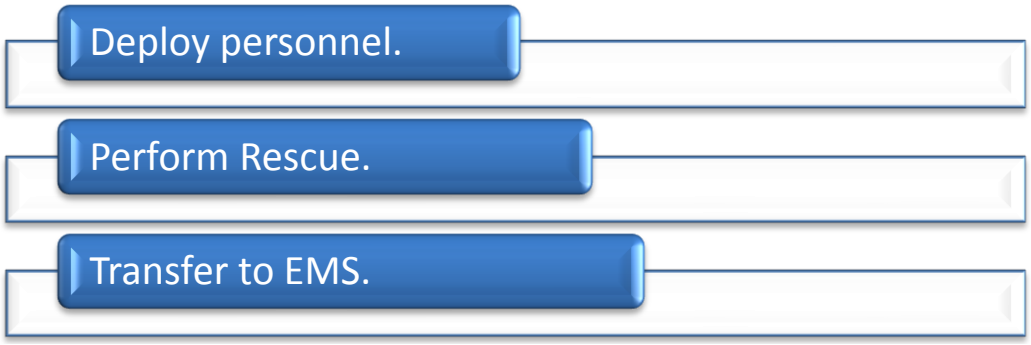
Phase 1 -Size-Up

- Establish Command.
- Secure witness or reporting party.
- Determine location, number and condition of patients.
- Identify hazards to rescuers.
- Choose the Operational mode: *Rescue* or *recovery mode.*
- Type of terrain –technical or non-technical.
- Determine additional resources required.

Phase 2 -Pre-Rescue Operations

- Make general area safe.
- Make rescue area safe.
  - Establish entry/accountability control.
  - Designate a Safety Officer.
  - Develop an Incident Action Plan.
  - Develop a back-up plan.
- Proper P.P.E.
- Determine appropriate rescue and packaging equipment.
- Pre-rescue briefing.

Phase 3 -Rescue Operations



Phase 4 –Termination

Considerations for Assignment

Assignments for the rescue team sector may include the following personnel. This team will be supported by additional sectors as required.

Incident Commander	
Rescue Sector Officer	
Safety Officer	
Rescue-1	
Rescue-2	
Belay-1	
Belay-2	
Inside Edge Attendant(s)	
Outside Edge Attendant(s)	
Riggers (may be re-assigned as haulers)	
R.I.T.	

Communication

Integrate the following standardized technical rope rescue key-terms with our adopted **Incident Management System**. *Benchmarking* of "patient located", "patient contact", "patient packaged" and "patient egressed" further supports operational effectiveness.

- **On belay:** Belay is operational. Response: Same
- **On rope:** Ready to rappel. Response: Same
- **Lower**: Let line out through the system. Response: Same
- **Raise**: Haul line through the system. Response: Same
- **Slack**: Decrease the tension in the system. Response: Same
- **Faster**: Increase the speed. Response: Same
- **Slower**: Decrease the speed. Response: Same
- **Stop, stop, stop**: All systems stop immediately. Response: Same
- **Off rope**: Rescuer is no longer on system. Response: Same
- **Freeze**: Stop all activity and do not move. Response: No physical movement.
- **Set Belay:** Set the Belay so it does not activate. Response: Belay Set

Technical Rope Equipment

The standard P.P.E. includes the following:

- Helmet
- Safety Glasses
- Class 3 Harness
- A descent control device that shall be a bar-rack
- Rappel Gloves
- Safety Footwear
- Enough equipment to self rescue (Ascend, knot pass)
  - Additional carabiner
  - Prusik Cords (2)
  - 1” Webbing (1)

This is the standard and minimum P.P.E. only.

Think ahead to the rescue that you are required to complete.

Sharp edges may dictate that edge-protection is taken with you.

Medical considerations may include the need to use a trauma kit or airway managment kit.

Communication challenges may dictate the need for radios, headlights, and cylume sticks.

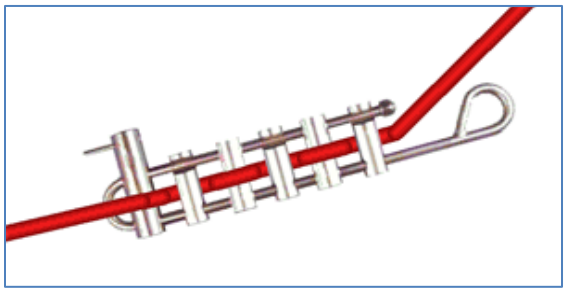
Software Inspection

Standards and manufacturers state that **life safety software must be inspected before and after each use. This is mirrored in our Procedure. Look and feel for:**

- Cuts and abrasions
- Excessive stiffness
- Glazing
- Lumps
- Dents
- Discolouration
- Age within manufacturer's specifications.

Bar-Rack

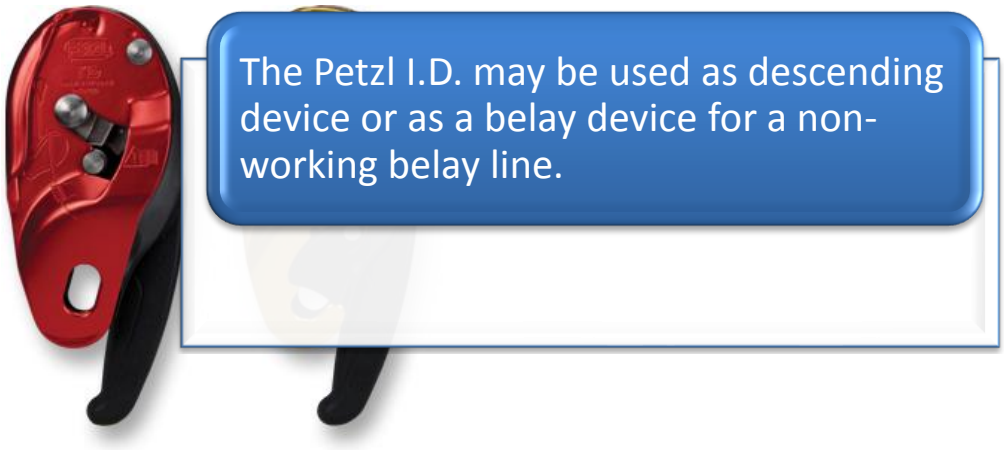
The **bar-rack** is our adopted descending device. The rope is woven through the device, alternating above and below the bars. Friction can be increased during descent by adding more bars, and decreased by reducing the number of bars and spreading them further along the spine.



This bar-rack is rigged as a right-hand break. All 6 bars are utilized at the start of the descent. A maximum of 2 bars may be dropped.

Industrial Descender

The G-rated device is red in colour and assigned to apparatus for the purpose of technical rope rescue.



Rope that is wet, frozen, dirty or new will react differently within any system.

The following demonstrates the use of this device as a belay.

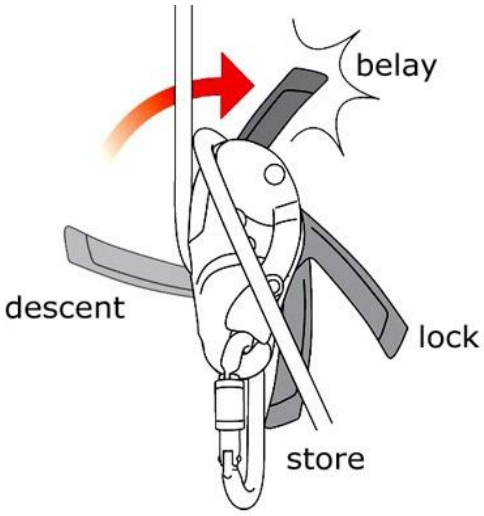
This passive decent control device allows the rope to track straight through the appliance so that rope twisting is prevented. It has several handle orientations that are as follows:

Attached to sternal D-ring of rescuer's harness via a carabiner.

Rope to brake-hand of belayer.

Hand-Held Operation Lever.

Rigged at anchor via a carabiner.



A dedicated belayer will use two hands while operating this device. One hand controls the lever while the second hand holds the braking side of the rope.

Open the moving side plate and put the handle in the displayed position to open the cam.

Insert the rope as indicated by the diagrams engraved on the device.

Close the moving side plate and connect the I.D. with a carabiner.

Before each use verify that the rope is correctly installed and that the device is working properly.

The horizontal movement button may be used on horizontal or sloping terrain. The panic brake will activate easily.

DO NOT USE THE HORIZONTAL MOVEMENT BUTTON DURING A VERTICAL DESCENT.

Rigging Plates

Rigging plates may be used to organize and to bring multi-point anchors together so that loads are shared. The plate also allows the ability to add other systems if required, such as a haul system or another rappel system, once in operation.

We use the Petzl Paw which is rated for 36 kN.

There will be a maximum of 3 people of the plate. This includes the patient.

Edge Protection

Edge protection is used as a barrier between the rope(s) and the surface of where the rope is moving or is in static contact. Use edge protection to look after your equipment!

These devices provide a smooth surface to lay the rope into during raising, lowering or rappelling operations. They include edge rollers, caterpillars, nylon running sheaths, and rope wraps.

It is paramount that all edges be inspected for sharps, the potential for abrasion and to protect the software from excessive dirt, oils and tree sap.

Knots and Hitches

Knot efficiency is considered the strength of the knot and its effect on the rope. It is shown as a percentage of the rope's Minimum Breaking Strength (MBS). For example, the fig-8 on a bite is 80 % efficient and will therefore reduce the strength of the knot by 20 %. With a rope rated MBS of 40 kN (9000 lb/f) the efficiency will be 32kN or 7200 lbs/f.

The Figure Eight provides a quick and convenient stopper knot. This knot is the basic building block of all figure-8 knots used within the fire service.

Knot or Bend	Efficiency	Inherently Tight	
Fig-8 on a bight	80 %	Yes	
Alpine Butterfly	75 %	Yes	
Water bend	65 %	Yes	
Fisherman's bend	90 %	Yes	
Tensionless hitch	100 %	No	

*This hitch is based on friction. The greater the surface of rope in contact with the object being used as an anchor results in a better friction.
When utilizing a tensionless hitch and as a rule of thumb:

A relatively round anchor, such as a tree, will provide more contact (and friction) as contrasted with an object with corners.

- The anchor should be at least 10 times the diameter of the rope.
- The rope will be wrapped a minimum of three complete wraps around the anchor.
- An anchor that is suitable, yet polished, will have less friction and will require more wraps.
- An anchor that is suitable, yet relatively a small diameter, will have additional wraps to ensure proper friction.
- The end of the rope shall be terminated back onto the line allowing 2 feet of slack line.
- The hitch will always be tested under load prior to being used as a life-load.

Anchors and Anchor Systems

Anchors come in all shapes and sizes. There are three broad categories of anchors: Natural, structural and portable.

Natural include trees and rocks, structural include columns, beams, fixed HVAC units, and anchors for window cleaning equipment. On rooftops, it is also possible to wrap a rope through a roof level scupper and around a low parapet wall. Rescuers should be watchful for corroded metal, weathered stonework, and deteriorating mortar. Avoid using vents, metal flashing, rain gutters, and small chimneys. Portable anchors include vehicles. When using a vehicle for an anchor, ensure the system is *locked-out*. Always use caution when choosing anchors.

Never assume that an anchor is safe by appearance alone or because it has worked in the past. Always double-check every anchor every time!

The selection of an individual anchor point may be a difficult task. Consider the following:

- Is the anchor stable? Attempt to move the object.
- Is the anchor in-line with the load? If the anchor is not in-line, a secondary anchor will be required to either use as an adjustable anchor or a redirect.
- Does the anchor have sharp edges? If so, edge protection will be required.

- How strong is the anchor? This question is often difficult to answer. Look at the material it is made from. If it's engineered as an anchor it will have a stamp.
- What is the maximum load that will be applied to the anchor system?
- What forces will be applied to the anchor when loaded? The consideration, other than load, is torque. Torque is the angular rotation away from the base of the anchor.
- Where feasible, rig towards the ground on an anchor, such as a tree, to avoid torque.

Torque can be calculated by multiplying the load by the distance, in feet, away from the fulcrum.

Single-Point Anchors

A single-point anchor system is used when the rescuer is absolutely certain an anchor will not fail. Again, do not assume anything—make sure to investigate the anchor's stability thoroughly. The rescuer must estimate the weight of the load (including the patient) to determine what material to use and how to rig the single-point anchor. The use of a single-point anchor has a place in scene operation. For example, a single-point anchor may be appropriate for approaching an edge and performing an assessment. However, **single-point anchors are strongly discouraged in situations where a multi-point anchor is available**.

Multi-Point Anchors

A multi-point anchor system is generally more desirable than a single-point anchor system and is considered the "go to" system for most rescue applications. Two or more anchors must be connected with a **load-distributing anchor system**. A load-distributing anchor system provides two benefits to rescuers: It distributes the load between the anchor points and typically provides an increased margin of safety.

It is our common practice to use multi-point anchor systems.

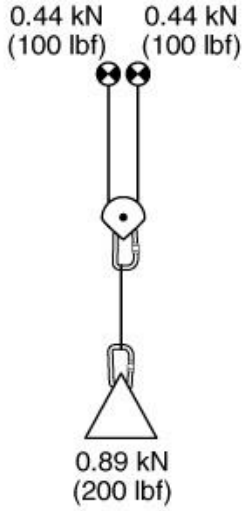
Critical Angles

The critical angle is the angle that is formed between the legs of the rigging. Critical angles can be used to our advantage but there are certainly disadvantages.

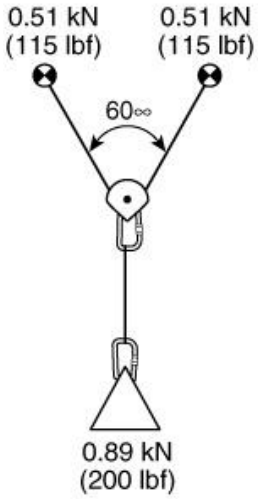
Angles that are 90 degrees or less are force minimizers.
That is; they reduce the force on each anchor leg.

Angles that are greater than 90 degrees are force multipliers.
That is; they increase the force on each anchor leg.

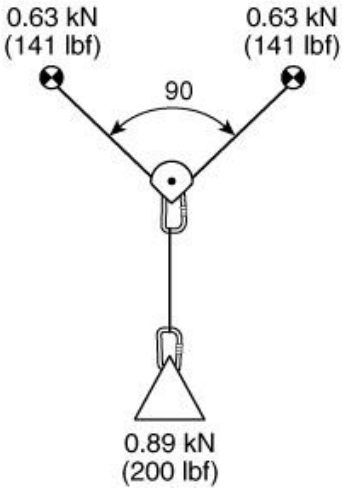
As a general rule, when building multi-point anchor systems keep the angle at less than 90 degrees.



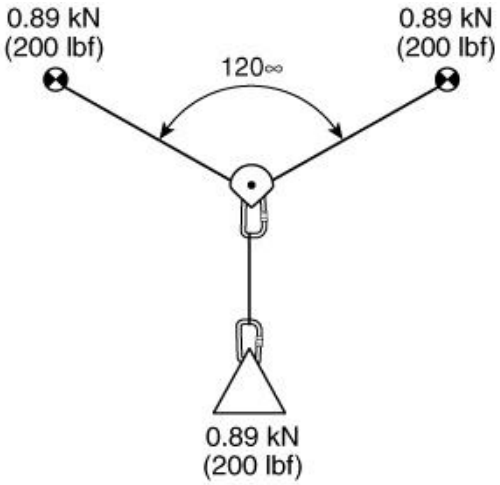
At a 0 degree angle, the load on each anchor will be 50%. With a two-point load-distributing anchor system holding a load of 200 pounds, each anchor holds approximately 50% of the load, or 100 pounds.



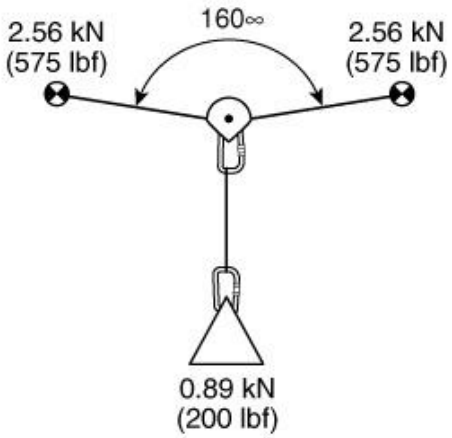
At a 60-degree angle, the load on each anchor will be 50% - 55 %



If the angle in the load-distributing anchor system is increased to 90 degrees, the resulting weight on each anchor is 71% of the load.



If the angle is increased to 120 degrees, 100% of the load will be imposed on each anchor.



At 150 degrees, the load on each anchor would be 200%.

As the angle increases, so does the corresponding load on each anchor.

“Go-To” Principles

There are many techniques of building and utilizing multiple-anchor systems. The following are a few preferred “Go-To” techniques. These techniques are preferred since it standardizes what is expected. However, the technique must meet the operational and safety requirements.

- We will use a load sharing anchor as a preferred anchor any time life-dependancy is on the rope system.
- We will generally use an adjustible system by capturing each line with two prusiks.
- We will generally use an anchor plate to establish a clear and clean housekeeping system.
- We will establish an independent anchor system for outside attendants.
- We will establish an independent anchor system for a R.I.T.
- The system shall be checked by a rescuer that was not assigned as part of the rigging team.

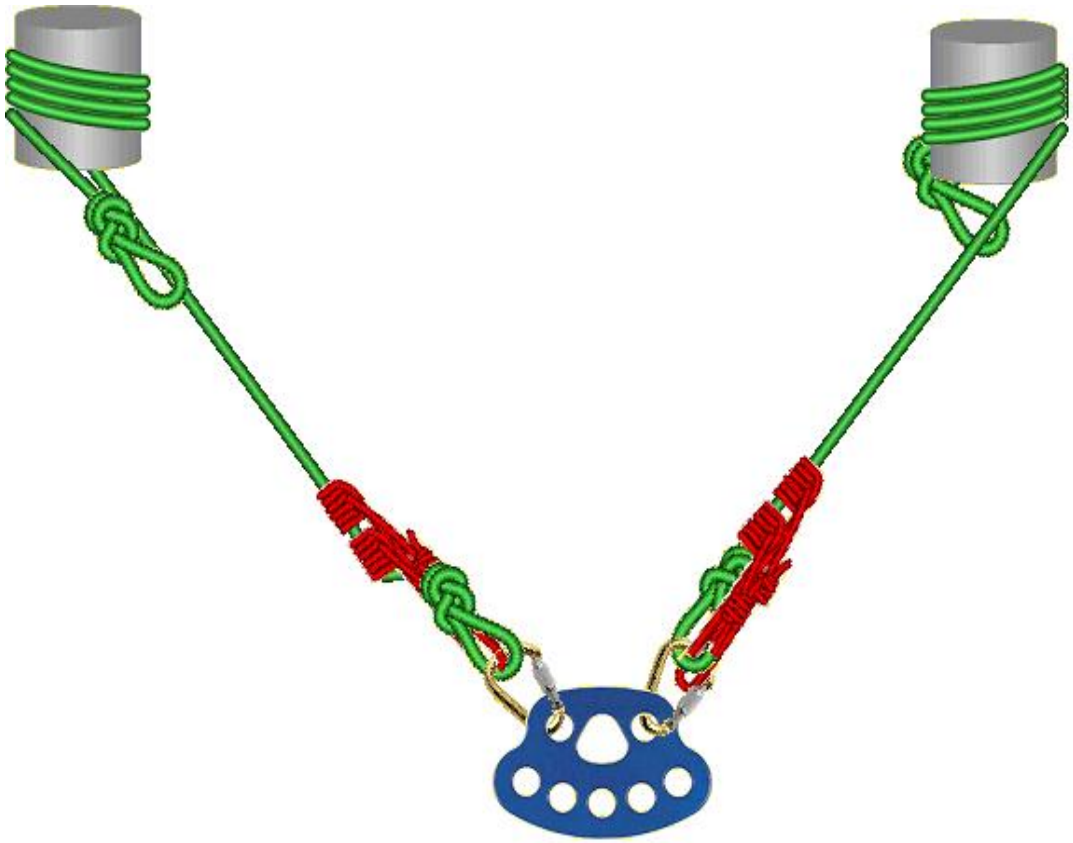
Load-Sharing Examples

Anchor plate placement considerations include the proximity to the edge and the need/ability to haul. A haul system requires a significant area that is either in front of the plate or a re-direct to the side of the plate.

We will generally utilize a 2-leg or a 3-leg load-sharing adjustable anchor. The following are a few “go-to” examples.

A tensionless-hitch captures each anchor. This hitch provides 100 per cent knot efficiency.

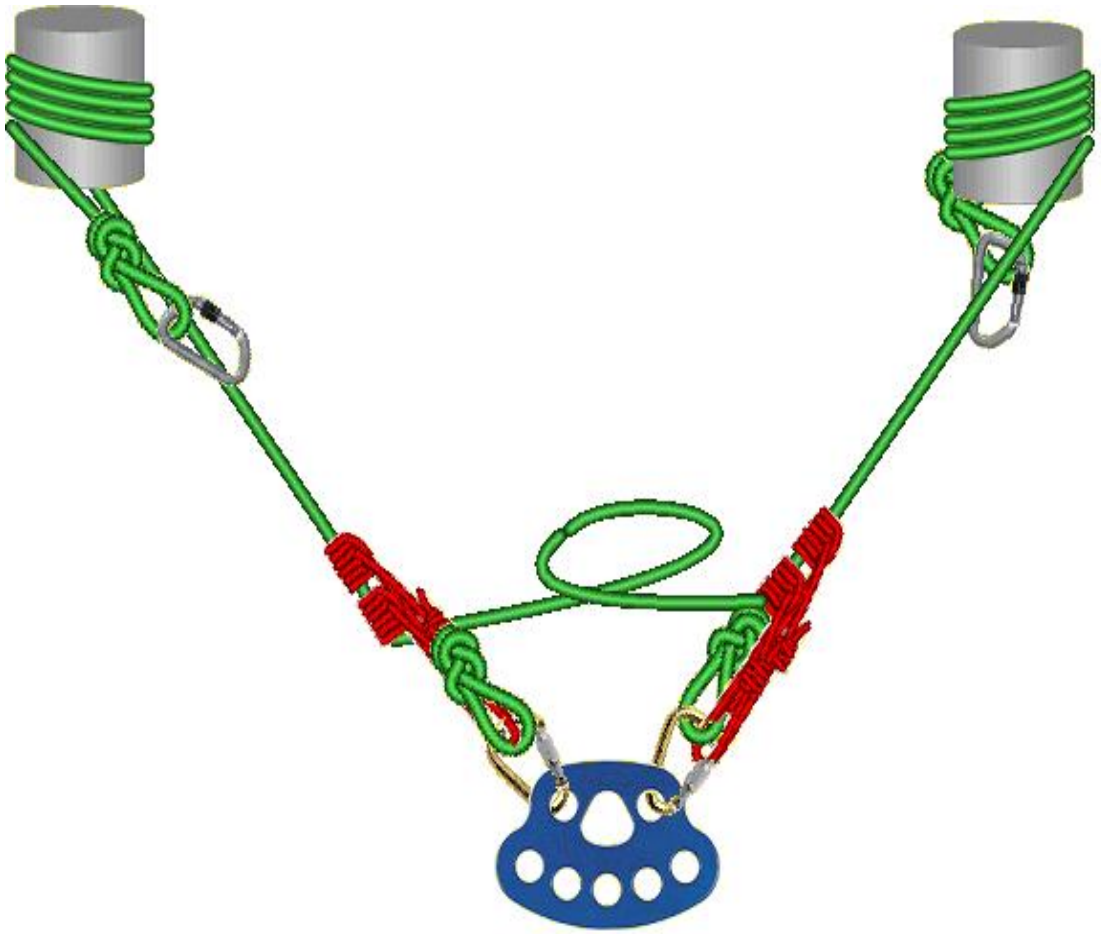
Each leg falls off the outside of the anchor. This increases the ability to adjust the anchor in its horizontal plain at the rigging plate. If the load distribution angle is too large, consider running each line off the inside of its respective anchor.



A tensionless-hitch captures each anchor. It's terminated by using a fig-8 follow-thru back to the rig line.

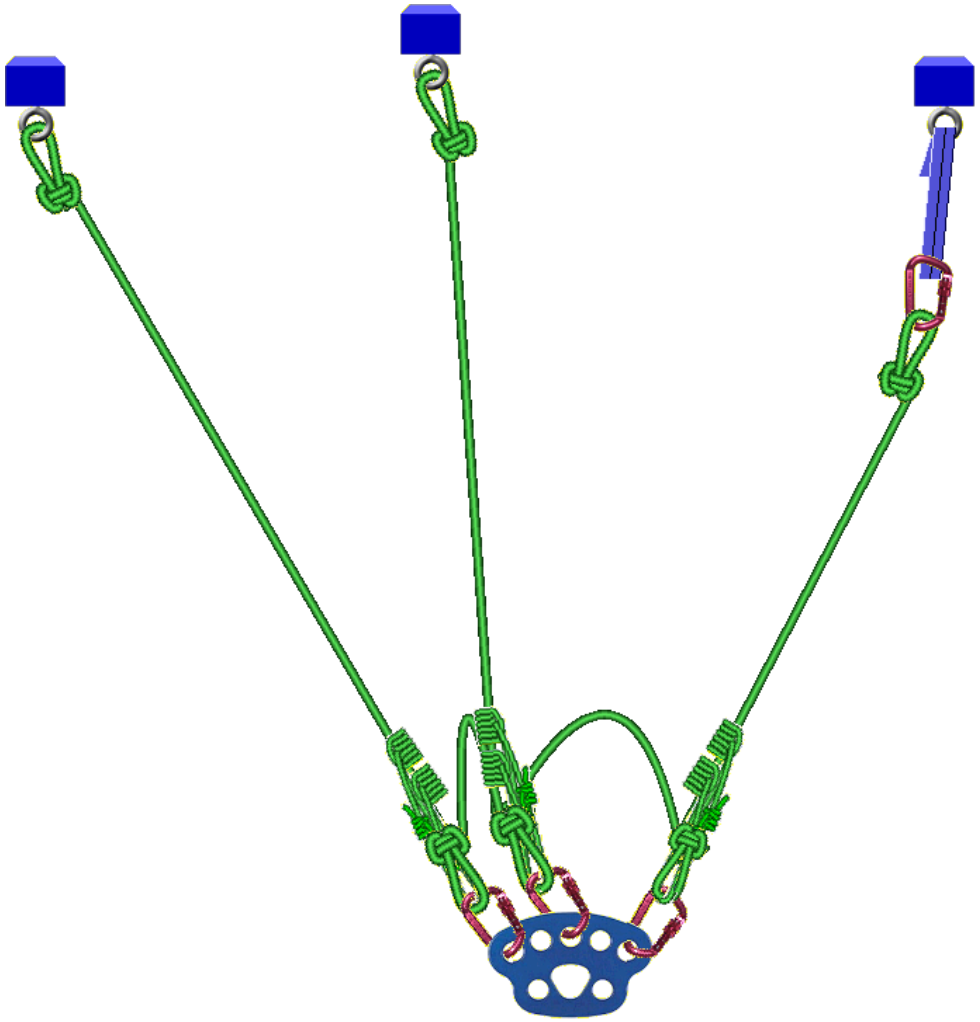
- Two ropes are used during this set-up.
- A double-prusik is utilized on each line to adjust the location of the plate.
- Each leg of the rope is secured and terminated at the rigging plate.
- This is a 2-leg load-sharing adjustable anchor.

This technique is ideal if the anchors are within relative proximity to the plate (80 feet). A single 200 foot length of rope can capture both anchors. Each leg is separated at the plate thereby effectively creating two lines.



- Here, we see 2 anchors being captured.
- A tensionless-hitch captures each anchor. It's terminated by using a fig-8 on a bight with a carabiner back to the rig-line.
- One rope is used during this set-up.
- A double-prusik is utilized on each line to adjust the location of the plate.
- Each leg of the rope is secured and terminated at the rigging plate.
- This is a 2-leg load-sharing adjustable anchor.

- Here, we see 3 anchors being captured.
- An anchor strap or fig-8 follow-thru captures each anchor.
- One rope may be used for this set-up.
- A double-prusik is utilized on each line to adjust the location of the plate.
- Each leg of the rope is secured and terminated at the rigging plate.
- This is a 3-leg load-sharing adjustable anchor.



Rope Systems

A Rope System that is determined as a life-load will utilize a two-rope system. One rope system is used for the descent control device, lowering, and subsequent raising of rescuer and patient, and is otherwise known as the working line. The other rope system is used as a belay line. This line holds no load; it is there to arrest a potential fall of the load. There are many techniques and variations of this principle.

Mechanical Advantage

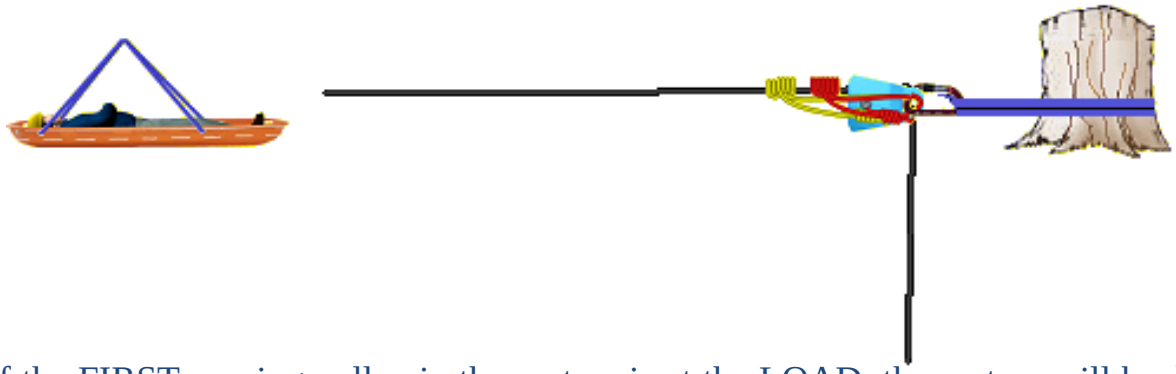
The purpose of a mechanical advantage system is to retrieve patients and rescuers and reduce the workload to decrease the possibility of injury to rescuers.

There are two types of mechanical advantage systems: simple and compound. A simple mechanical advantage system is a series of ropes and pulleys that begin at either the anchor or the load, and terminates in the hands of those doing the hauling. A compound mechanical advantage system is a simple mechanical advantage system pulling on a simple mechanical advantage system.

Mechanical advantage systems are identified as being either 2:1, 3:1, 4:1, 5:1 etc., depending on the proportion of force-to-lift desired. If the load is extremely heavy, a greater mechanical advantage system will be constructed. If the load is light, a system with less mechanical advantage may be all that is necessary. For example, with a 300-pound load, if no mechanical advantage system were used, the ratio of force to the load must be 1:1. That is, 300 pounds of force is required to lift the load. Compare this with a 2:1 system where only 150 pounds of force is needed to lift the same load, or a 3:1 system, requiring only 100 pounds of force. The vast majority of rescues can be effectively completed using simple systems.
The following rules will help the rescuer identify and build the appropriate simple mechanical advantage system given the ratio desired. These rules apply to simple mechanical advantage systems only.

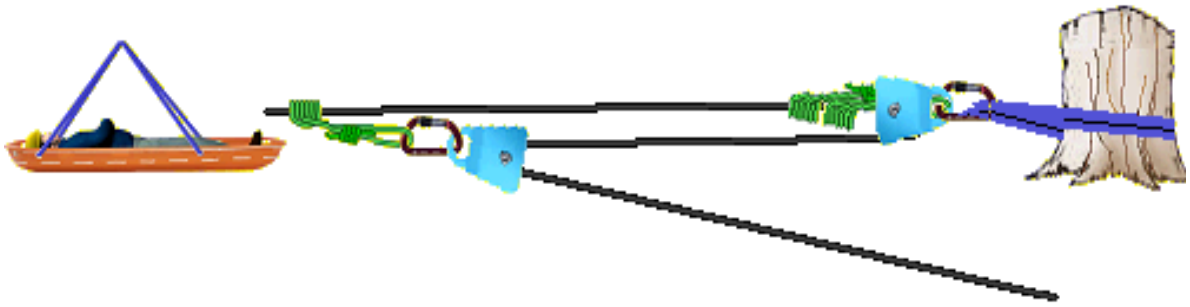
If the first pulley (or only pulley) in the system is attached to the anchor, it adds nothing to the mechanical advantage; it is only a change of direction. This is a 1:1 with a re-direct.

If the load is affected by gravity, a break must be used in the system. A double-prusik wrap is added to this illustration as a positive capture break.



If the FIRST moving pulley in the system is at the LOAD, the system will be odd. This is a 3:1 Mechanical Advantage.

Here is a 3:1 M/A with a double-prusik break. This is often pre-rigged in a rescue kit and is the "Go –To" system. It's known as a "Z-rig" due to its appearance.



Remember a breaking device is required in the system. If the rescuers let go of the haul line gravity will take over.

Belay Systems

The purpose of the belay line is to arrest the fall of the load should the working line slip. A true belay will dictate two independent lines be set up using separate ropes and anchors.

If the working line was to slip or fail, the weight of the load is transferred to the belay line along with the additional shock load. The total force imposed depends on the distance the load falls before it is arrested. This force is transferred through the belay system to the anchor.

It is important to note that every Rope System is designed, set-up and utilized to ensure there is no slip or shock-load. The intent of a belay is exclusively an additional life-safety measure.

It is imperative that a belay line be designed and utilized correctly to ensure that, if it activates, it will work as designed.

The belay line will be connected to the rescuer's sternal D-ring.

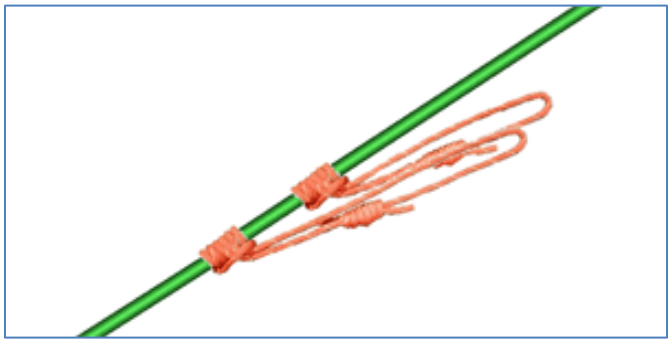
Positive Capture Devices, that include an I.D., are very effective in belaying a rescuer. The I.D., manufactured by Petzl, is the belay of choice.

Belay line to rescuer's sternal D-ring.

Connection point to the anchor system, such as a rigging plate, via a carabiner.

The rescuer assigned to belay **shall** maintain active hands-on belay at all times while the rescuer is on-rope. If the belay system is locked, the assigned rescuer shall remain at the belay site and remain dedicated to the belay line.

If a belay device such as an I.D. is not used, a tandem prusik technique may be implemented for most operations. This involves wrapping two 3-wrap prusiks around the belay rope and connecting them to the carabiner that is attached to the anchor system.



The tandem prusik belay is highly effective in arresting falls as well as decreasing the distance the load travels before coming to a stop.

The reduction in travel distance will minimize dynamic loading on the belay line. If the rescuer is being lowered on the working line, and the belayer is not doing his or her work properly, the tandem prusik can "grab" the rope.
If this happens, the problem can be fixed in one of two ways. The load can be raised up on the working line, thereby transferring the load back to the working line. The prusiks that were "stuck" on the belay line can be loosened and the lowering operation can continue. Another way is to utilize a load-releasing hitch.

Safety Procedures and Safety Checks

All equipment utilized for technical rope rescue meets industry standards. As long as approved and recognized equipment, systems and techniques are used within the scope of practice and training, the rescue team will be working within safety parameters.

However, an atypical rescue may require a technician to calculate system safety factors.

The System Safety Factor is the ratio of the load compared to the strength of the individual components in the rope system. To calculate the SSF you will need to know the Minimum Breaking Strength (MBS) for each piece of equipment and the weight of the load. Divide the strength of the component by the load. This provides the SSF for that piece of equipment. The calculation is required for every piece of hardware and software in the system.

Considering the NFPA 1983 *Standard on Life Safety Rope and Equipment for Emergency Services* is designed for manufacturers and not rescuers, there is no published standard mandating a specific SSF. However, the majority of urban rescue teams adopt a SSF of 10:1.

For the purpose of our calculations a SSF of 10:1 shall be calculated and maintained during all live-load operations.

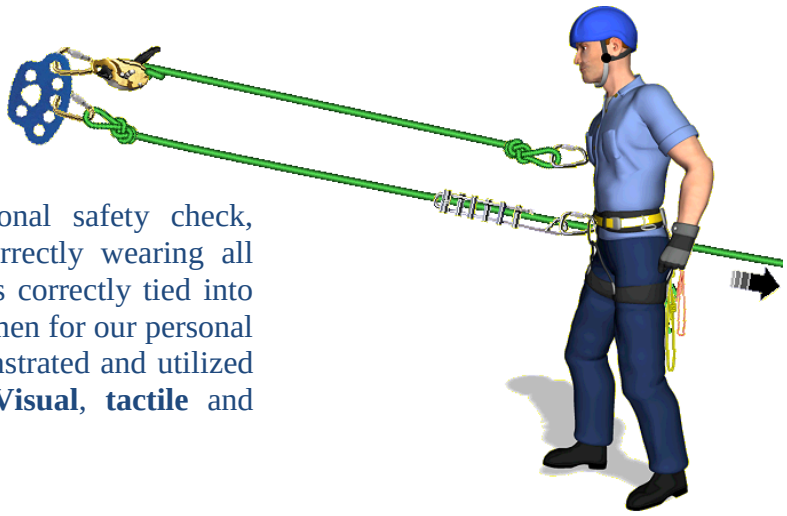
System Safety Checks

The System Safety Check is a method where a rescue team member who was not involved in the rigging is assigned to inspect parts of the system. The system is inspected using both a visual and touch method. Hands are placed on *every* component within the system. The *system safety check* is often completed by a dedicated team member such as a *Safety Officer*.

When performing a system safety check ensure:

- The ISO will appoint a rescuer that was not involved in rigging the system to perform the safety check.
- The anchors are adequate.
- Knots are correctly tied and dressed.
- Carabiners are locked and loaded properly.
- Pulleys are reeved correctly.
- All systems are operable. Test the system under load prior to placing a rescuer on the system.

Personal Safety Check



When performing a personal safety check, ensure each rescuer is correctly wearing all required proper PPE and is correctly tied into the system. A specific regimen for our personal safety check will be demonstrated and utilized during all training. The **Visual**, **tactile** and **verbal** check consists of:

- The rescuer being correctly connected into the system.
- The descending device is properly reeved and loaded.
- The descending device is engaged into a locked carabiner.
- The locked carabiner is engaged in the D-ring of the harness.
- The harness is donned correctly and snug.
- The rescuer has sufficient equipment to self-rescue.
- The helmet is donned with straps done up.
- If required, Safety Glasses are donned.
- Gloves are donned.
- A belay is in place.

All rescuers working within proximity to a fall will be secured into the system or another suitable travel restraint system.

A rescuer, working as an *inside edge attendant*, may utilize the existing system and tie into a static line with a prusik. This allows controlled movement along the system from the rigging plate to the edge.

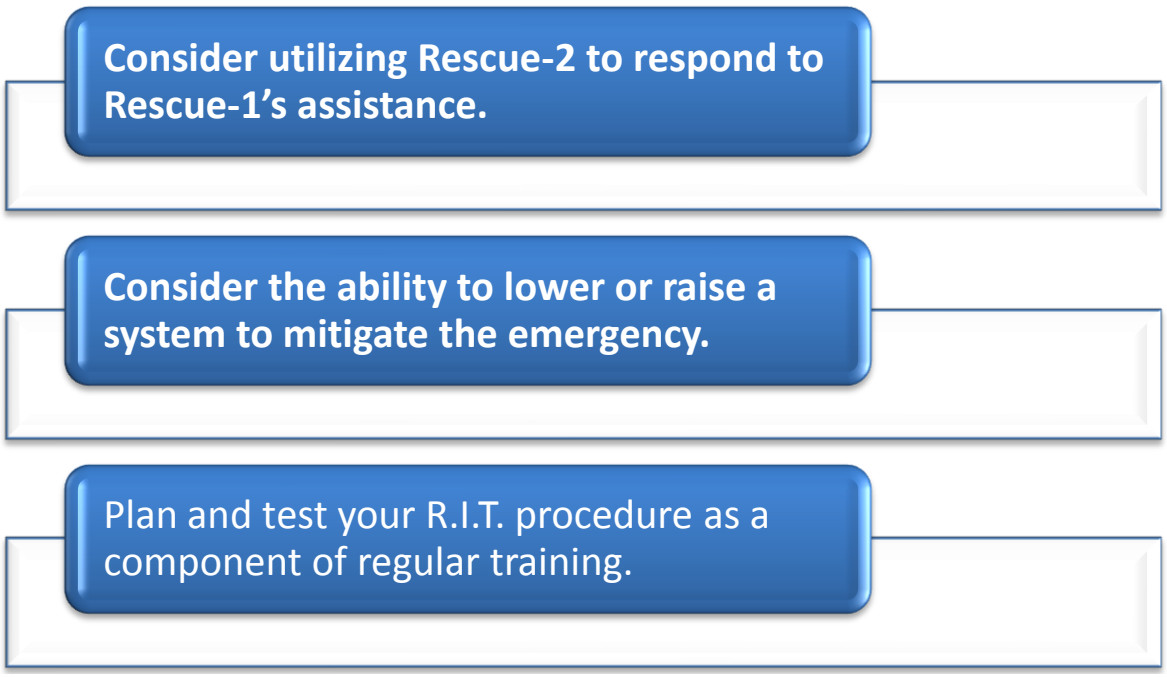
The same technique can be used for a rescuer to approach an edge during a size-up.

Set and **check** the prusik prior to working.

Rapid Intervention Crews

A Rapid Intervention Team (R.I.T.) is a built-in safety factor for personnel operating at an emergency scene. The primary task of the R.I.T. is to respond to any firefighter reported in distress.

In the event of an incident where the on-rope rescuer is unable to self-rescue, a RIT may be deployed. This is one avenue of a rescue plan.



Patient Rescue -Introduction and Considerations

Once the patient is located, conduct a quick primary survey (as is recommended), including airway, breathing, and circulation assessment. It is likely that the best patient care may be to egress the patient immediately and provide emergency care as quickly as possible.

Consideration must be given to the type and extent of injuries the patient has sustained prior to deciding how to package the patient for removal. The rescue device chosen will depend on the environment and the condition of the patient. Devices such as rescue stretchers and evacuation triangles are available.

Suspension Trauma

Orthostatic intolerance may be experienced by workers using fall arrest systems. Following a fall, a worker may remain suspended in a harness. The sustained immobility may lead to a state of unconsciousness. Depending on the length of time the suspended worker is immobile and the level of venous pooling, the resulting orthostatic intolerance may lead to death. Such fatalities often are referred to as **"suspension trauma."**

Unconscious/immobile workers suspended in their harness will not be able to move their legs and will not fall into a horizontal position, as they would if they fainted while standing. During the static upright position, venous pooling is likely to occur and cause orthostatic intolerance, especially if the suspended worker is left in place for some time. Venous pooling and orthostatic intolerance can be exacerbated by other circumstances related to the fall. For example, shock or the experience of the event that caused the fall, other injuries, the fit/positioning of the harness, the environmental conditions, and the worker's psychological state all may increase the onset and severity of the pooling and orthostatic intolerance.

Unless the worker is rescued promptly using established safe procedures, venous pooling and orthostatic intolerance could result in serious or fatal injury, as the brain, kidneys, and other organs are deprived of oxygen.

- Rescue suspended workers as quickly as possible.
- Be aware that suspended workers are at risk of orthostatic intolerance and suspension trauma.
- Be aware of signs and symptoms of orthostatic intolerance.
- Be aware that orthostatic intolerance is potentially life threatening. Suspended workers with head injuries or who are unconscious are particularly at risk.
- Be aware of factors that can increase the risk of suspension trauma.

Patient Packaging

The rescuer must place the patient into an approved and rated rescue device. If the patient is conscious and able to assist, it may be as simple as placing a harness on him. This allows the patient to be clipped into the retrieval system for easy egress. If the patient is unresponsive or unable to assist, it is necessary to place the patient into a device such as an International Stretcher. A C-collar should be placed on the patient prior to packaging if compromise of the cervical spine is a consideration. Most baskets will also fit a spinal back-board.

Adjunctive equipment, such as oxygen delivery systems, may also be secured in the stretcher.

Pick-Off

A *pick-off* is a controlled rescue technique where a rescuer places and secures a patient onto the rescue system. We use a pitagor which is an evacuation triangle with shoulder straps. It's generally referred to as a diaper since it is placed around the patient's waist and through the patient's legs.

Pick-Off Equipment Set-Up

Stage the pick-off equipment on the non-dominant side so that it does not hinder a rappel.

Orientate the 3 D-rings so that the yellow strap is in the middle of the two blue.

The pick-off strap will be connected into the malion triangle, via a locked carabiner.

A full safety check is conducted as per safety check procedure.

Rescue 1 shall be the primary rescuer and make patient contact.

Rescue 2 shall be deployed with Rescue 1 and will be in a position to assist as required. Rescue 2 shall confirm verbal and visual system safety checks during patient *pick-off* and communicate with the assigned edge attendant.

Pick-Off Procedure

1. Descend towards the patient.
2. Methodically monitor your environment for hazards and initiate a general assessment of the patient. Ensure your safety.
3. Communicate an update that you have made patient contact.
4. Position yourself so that you can secure the patient. This is generally aligning the patient's hips at the level of the rescuer's arm pits.
5. Secure yourself by placing all bars onto your bar-rack and tying off your rack.
6. Remove the carabiner, housing the pitagor, from your harness.
7. Remove a blue and a yellow strap. Orientate the pitagor and wrap it around the patient in a manner where its webbing and stitching is on the outside.
8. Connect blue to blue back in the carabiner so it's around the waist. Confirm there is no entanglement and all ropes are not captured within the pitagor.
9. Connect the yellow strap into the carabiner by reaching below the patient and bringing the strap up between the legs. There should be no twists in the pick-off device. Lock the carabiner.
10. Complete a tactile, visual and verbal safety check. Ensure the diaper is fully wrapped around the patient. The two blue straps and one yellow strap are placed into a locked carabiner.
11. Re-affirm check-11 with Rescue-2.
12. Pull the pick-off strap so the patient is brought into your body.
13. Communicate an update that you have secured the patient and that you are ready to go back onto rope. Your belay will be unlocked.
14. Proceed to rappel while maintaining control of your patient.

Communicate key benchmarks to and from the team so that each stage of the rescue is **planned** and **methodical.**

Scene safety, hazard mitigation and protection of a patient are also required. This may include rendering initial first-aid and providing P.P.E. to the patient that may include a helmet.

Basket Rescue

The International Stretcher can be used in a vertical or horizontal plain.

There are several key considerations when preparing the basket:

- Regardless of orientation, all 4 anchor points on the basket must be properly captured.
- Ensure that each carabiner is positioned so that the locking mechanism is facing into the basket and therefore protected.
- Orientate the spider straps so the quick release is facing in and protected from accidental release.

A vertical set-up will utilize a carabiner capturing each of the 4 points on the basket. All 4 spider straps will be utilized. Two shall run each side of the basket and terminate in the distal carabiner. These straps will run towards the head and through the carabiner as displayed.

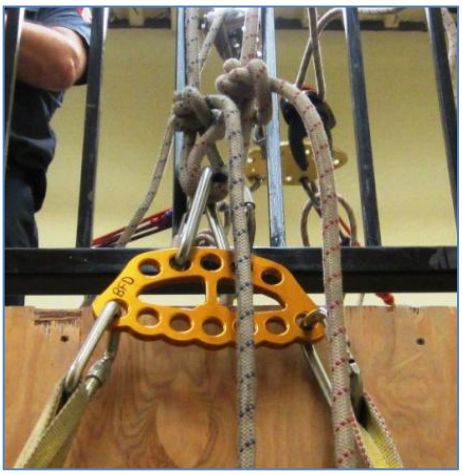
The basket's spider straps are rigged into a plate.

A horizontal set-up will utilize a carabiner capturing each of the 4 points on the basket.



The basket's spider straps are rigged into a plate.

Consider keeping the spider straps relatively short. This will facilitate an easier edge transition.



There will be 1 basket attendant assigned to the patient. He will have a prusik attached to his main and belay so that he is supported by the rope system at all times while working at height.

The basket and the basket attendant shall be controlled via a lowering/hauling system.

If a haul is required a double prusik shall be placed onto the main line to be used as a brake while the system is converted to a haul.

A bar-rack shall be used as a lowering device and the Petzl I.D. shall be used as a belay device.

Working Line
–Set up to Lower

Belay Line

Any required *outside edge attendants* shall be placed onto a 2-rope system attached to an independent rope and anchor system from the basket.

Basket Attendant shall have a prusik attached to his main and belay so that he is supported by the rope system at all times while working at height.

Outside Edge Attendants shall utilize a 2-rope point of connection.

Inside Attendants shall utilize a travel restraint system that may include a one point connection since they are not working on-rope.

Each anchor plate shall have a maximum load of three people. Additional anchor points, and rigging plates, may be required for Outside Attendants, R.I.T. operation or additional rescuers on-rope.