GLOSSARY

"A" Frame: A temporary structure used to position ropes near an edge or above an obstruction. An "A" frame can greatly reduce difficulty in overcoming edge problems during high angle evacuations and during highline work. A pulley is generally suspended from the apex of the "A" frame where the sides are joined together.

Abuse (equipment): Any intentional or unintentional use or implementation of a piece of equipment for which it was not intended or designed originally.

A.N.S.I (American National Standards Institute): This group develops and sets standards for equipment integrity.

A.S.T.M: American Society for Testing and Materials. This group sets standards for rescue operations and is comprised primarily of volunteers and people well educated in the field.

Abrasion: The deteriorating and damaging effect that occurs when a rope is rubbed against a rough surface.

Anchor: A generic term for the combination of anchor points, material, and equipment that allows a secure attachment of rope and personnel to a "bombproof" object, such as a tree, rock, fire apparatus, or building.

Anchor Angle: The angle created between two individual anchors where they join together to form a main attachment point. The greater the angle, the more force on each anchor. As a rule of thumb, the anchor angles should be kept at less than 90 degrees.

Anchor Point: The object(s) that the rope or webbing is tied to or around.

Ascend: To climb up; used for ascending terrain or up a fixed rope.

Ascending: A means of climbing up a rope with the use of prusik hitches or mechanical ascenders that are attached to the rescuer.

Back-tie: Rope that extends from the main anchor to an anchor point farther away. This is to back up the main anchor point. Usually constructed with a 3:1 mechanical advantage. Generally within a 15° radius behind the front anchor.

Becket: A carabiner hole at the "bottom" of a rescue pulley. Most commonly seen on a double pulley where the center plate has been extended.

Belay: Providing protection against a fall by handling a secondary unloaded rope (belay lifeline). In such a manner that is taken in or let out yet can be secured to hold this load in case of failure of the main lifeline or anchor etc. Used for lowering and raising systems. It is handled by a separate belay person, with a second lifeline, and is attached to a separate anchor from the main lifeline.

Belay Line: A second lifeline designed to provide fall protection. In a two line rescue system, the belay line provides the protection should there be a failure of the main lifeline or anchor system.

Belayer: The person assigned to operate the tandem prusik belay.

Bend: A knot formed by tying two ropes together, such as a double overhand bend.

Bight: A U-shaped bend in the rope. (It does not cross itself.)

Bombproof: Used to describe an anchor in which there is no chance of failure. One that will exceed all the expected and unexpected forces that may be placed upon it.

Bottom Belay: Used to belay a person rappelling by having another person pull on the bottom of the rappel rope. Usually the first rappeller will set up a bottom belay for any additional rappellers. Does not protect against an anchor or rope failure.

Bowline: A reliable knot that works well for end line rigging points. Should always be tied with a safety tie-off. The bowline is easy to untie once weighted with a rescue load.

Brake: A straight-pass or twisting friction device used for lowering rescue and extreme rescue loads. Brake bar racks and figure 8 descenders are all considered “brakes” when used in this fashion.

Brakeman: The person who operates the brake bar rack or figure 8 descender on lowering systems; controls the rate of descent.

Brake Bar Rack: The descent or friction device of choice for most rescues because it allows variable friction adjustment and can handle rescue loads.

Breaking Strength: The point at which destructive testing destroys the object being tested.

Carabiner: A steel or aluminum device with a spring-loaded gate which allows a rapid attachment to the rope, a harness, or to other gear.

Chest Harness: Designed to raise the center of gravity and keep the head up. It will also help distribute the forces on the body during a fall. (Worn over the arms and around the chest.)

Complex Pulley System: One that is neither simple or compound. Very limited in Department rescue systems and is seldom used.

Compound Pulley Systems: A simple pulley system that pulls on the end of another pulley system.

Control: The person who actually "runs" the rescue. Should be a person that is knowledgeable in rope rescue operations. The control person should be in position to see the entire top-side operation as well as the entire path of the stokes litter, if possible.

Critical Point Test: A test used to determine the inherent safety within a rope rescue system. In order to pass the critical point test, a system must have no point or single piece of equipment which, were it to fail, would cause catastrophic failure of the entire system. (See whistle test.)

Descender: A friction device used on a rope when rappelling to control speed and stay attached to the rope. (See figure 8 plate.)

Directional Anchor: A turning point for the main or belay lifeline using a pulley or carabiner, depending on the angle. If a directional is used in a main line, it is situated between the load and the lowering/raising system.

Distributive Anchor System: A method of anchoring an alternate to the "self-equalizing anchor" system. Any number of marginal points, whether natural or artificial, are joined together to yield a "bombproof" final connection point. In case one leg fails, the remaining anchors hold the load; however, not without significant shock force to the surviving anchors. Each marginal anchor in a distributive anchor system contributes to overall strength of the final anchor.

Double Overhand Bend: A very strong bend used for tying two ropes together. The bend is difficult to untie after being loaded. Used to form prusik loops. (Also called a double fisherman's.)

Dressing: Cleaning up a knot so that it will tighten in a neat, orderly fashion, which not only maximizes the knot's strength but makes a visual inspection easier to check for proper tying.

Dynomometer: Mechanical device used to measure tensile force. In the case of rope rescue, it is used to indicate the force on a rope or anchor.

Edge Protection: Use of canvas edge pads, edge rollers or other protective measures to reduce abrasion and friction on the rope.

Edge Tender: Rescuer(s) stationed at the edge to assist the stokes stretcher in overcoming the edge. Should be secured if necessary.

Edge Roller: A specialized piece of equipment designed specifically for edge protection. They can be linked together and are wide enough for multiple ropes.

Fall Factor: The length of a fall divided by the amount of rope in use. Ideally, the amount of rope in service between the rescuer and belay or anchor.

Figure 8: Figure 8 descender, figure 8 plate, rappel or lowering device designed for single person loads.

Figure 8 Knot: A simple end-line stopper knot used at the end of a lifeline.

Figure 8 on a Bight Knot: A strong end-line knot tied on a bight at the rope's end or in its mid section. Used widely in rescue. It can be very difficult to untie after being loaded.

Figure 8 Follow-through Knot: A knot tied follow-through style which begins with a simple figure 8. The running end then traces up through the object and retraces back through the simple figure 8. Can be very difficult to untie after being loaded. The knot of choice for joining two lifelines together.

Finishing a Knot: The dressing and setting of a knot after it has been tied.

Focal Point: A place where the rigging is directed. The station where you operate from.

Friction Device: A rappel or lowering system device. A figure 8 descender or brake bar rack.

Full Body Harness: A harness that incorporates a sit and chest harness together.

Gate: The part that opens on a carabiner, (spring loaded).

Gin Pole: A single pole made of metal or wood. Considered a compression member needing at least three guy lines to hold it rigid.

Girth Hitch (Larks Foot): One loop of a web sling around an object, or one turn of a prusik hitch around a rope. Not acceptable for any type of anchor system. Ideally used for setting protection when ascending.

Glazing: Fast rappels or shock loads on tandem prusiks can generate excessive heat causing a superficial melting of the sheath of a rope.

Half Hitch: A single turn in the rope over and through itself.

Hardware: Metal or aluminum rescue equipment. (See Rescue System Component Definitions V4-C6-S3.)

Harness: A system of straps or webbing providing connection points for rescue systems, belay lines, etc.

Hasty Chest Harness: A locking lark's foot that is placed around a victim, to quickly attach to the belay lifeline in a pick-off rescue.

Haul: The command to pull or raise the main lifeline

Haul Cam (prusik): The rope grab that connects the hauling system to the main lifeline.

Haul Team: The group of people who pull the main lifeline up.

Helicopter Rescue: Rescue involving the use of helicopters. The helicopter may land for patient loading, or use the hoist. Short haul rope systems may also be used. Ground based rescue should continue until it is confirmed that the patient has been loaded aboard the helicopter.

High Directional: A means of suspending a loaded rope high up so that edge related problems are reduced. There are structural, natural, and artificial high directionals.

Highline: A horizontal rope stretched tightly between two points used to transport rescuers.

High-Strength Anchor: A simple, yet extremely strong method of anchoring a rope to a tree or large boulder by making repeated wraps around it. (Used in swiftwater rescue systems and highlines).

High-Strength Tie-Off: A tie-off that is able to use almost all of the innate strength of the rope by not placing knots or sharp bends in the rope.
(See Kootenay Carriage.)

Hitch: A tie that fastens to an object, such as a prusik hitch. If the object is removed the tie will almost always fall apart.

Kernmantle: Rope construction that has an inner core (kern) wrapped and protected by an outer sheath (mantle).

Kilo Newton (kN): Approximately equal to 224.8 lbs. of force (metric).

Knot: A type of tie. The securing of rope on itself so that it is fast.

Knot Pass: The act of passing a knot or bend through a pulley, tandem prusik belay, or lowering system using a precise methodology as not to compromise safety.

Kootenay Carriage: A large pulley designed for knot passing, highlines, and high-strength tie-offs.

Life-Safety Rope: Rope that will carry live loads and meets minimum NFPA and/or OSHA recommended breaking strength.

Lifeline: All Department rescue ropes shall be referred to as a lifeline.

Load: A mass; that which puts tension on a system.

Load Releasing Hitch (LRH): Used only on belay line anchors, it has two functions: one is to release tension on the belay line if the tandem prusiks set, and two, is that the way in which the hitch is tied will act as a shock absorber and will reduce the impact on the rescuer if a fall occurs.

Lock-Off: The act of positioning the rope in a lowering or belay system which secures it from advancing. The belayer or brakeperson can lock-off their respective activities by merely changing the brake and hand position and gripping harder.
(Not to be confused with “tie-off”).

Long Tail Bowline: A bowline that is tied several feet from the end of the rope. The long tail can be used for other attachments, for example: victims, rescuers, etc. This bowline does not need a back-up knot. The further attachment of the tail prevents the bowline from becoming untied accidentally.

Loop: The rope forms a circle and crosses over itself.

Lowering: The act of lowering down a load, or rescuer using rope under control under a friction device (not to be confused with rappelling).

Low-Stretch: Refers to rope that elongates less than 2%. Often incorrectly referred to as a static rope.

Mainline: The lifeline with the friction device attached to on a lowering system. In a raising system it will have a mechanical advantage or pulley system attached to it. The primary load-bearing rope as opposed to the belay lifeline which is without tension.

Margin of Safety: The strength of the system divided by the maximum load that will be put on it. The NFPA recommends a 15:1 safety margin.

Mariners Hitch: A type of load releasing hitch which uses webbing.

Mechanical Advantage (MA): The ratio of the weight of the load to the amount of pull required to lift it. The trade off is less input force, but a greater distance requirement to move the load. There are two types of mechanical advantage:

1. **Ideal Advantage:** The mechanical advantage that would result without friction in the pulley, or bending rope, stretching or other complicating factors. It is the easiest type of advantage to understand and is commonly what is meant when one specifies a pulley system's mechanical advantage in rope work (a.k.a. theoretical advantage.)

2. **Practical Advantage:** This is always less than the ideal or theoretical advantage and can be obtained by experimental measurement or calculation in the efficiency of the various components, such as a rope-pulley combination.

Münter Hitch: A friction hitch used in the formation of the radium release hitch.

NFPA (National Fire Protection Association): This organization develops safety standards for the fire service. Specific standards relating to rope and rescue equipment are covered under NFPA 1983 Standard on Fire Service Life Safety Rope and System Components.

OSHA (Occupational Safety and Health Administration): A part of the Department of Labor intrusted with enforcing safety in the workplace.

Patient Packaging: The lashing and attachment of a patient into a stokes litter.

Pick-Off: The rescue technique of being lowered to a victim, placing them into a chest and sit harness, and attaching them to both the main and belay lifelines.

Picket System: Anchor system constructed by using steel pickets driven into the ground and back tied together.

Pig System: A mechanical advantage system attached to another rope system. The two together are the piggyback system, while the pulley system used to create it is simply called the “pig rig”.

Pre-rig: A fully adjustable system designed to connect the stokes litter with a victim and rescuer(s) to both the main and belay lifelines. This also used in helicopter hoist operations.

Pre-Tensioning: Pre-tensioning is needed on a steep or high angle system to pull all stretch out of the ropes and to tighten up all knotcraft in the mainline. This will alleviate an undesired drop often experienced at the edge of a cliff.

Prusik Hitch: A friction knot used for tandem prusik belays, self-minding ratchets, haul prusiks, and as a self-belay when rappelling.

Prusik Loop: A pre-tied loop of 8mm. prusik cord. Department prusiks are cut in 4’ 6” and 5’ 6” lengths.

Prusik Minding Pulley: A pulley used in the belay or ratchet positions. The Prusik Minding Pulley’s construction allows it to hold the prusiks automatically as the rope is pulled through without a rescuer having to tend the prusik.

Pulley: A mechanical device used for changing the direction of a moving rope.

Rappel: To descend a rope that is anchored at its upper end, in a safe, controlled manner.

Ratchet Prusik: A prusik hitch designed to hold the main lifeline when the raising system is reset.

Rescue Load: Defined by the NFPA 1983 as 600 lbs. This would include a victim, rescuer, and all related rescue equipment.

Reset: The act of resetting the pulley system for another throw after it has fully collapsed.

Rig: To secure ropes to anchors. (Set up rope rescue systems.)

Rope: Rescue lifelines, drop bag lines, ladder halyards, and prusik cord.

Rope Bag: Heavy-duty cordura nylon bags designed to store, carry, and deploy lifelines. It also offers protection from rope damaging ultraviolet rays.

Rope Log: A written log (Form 247) of a rope’s purchase, date of issue, size, and usage in order to have a written history of a specific rope’s use.

Running End: The end of the rope which is being worked on.

Safety Factor: The ratio between working loads and the weakest link in a system using the rated breaking strength of each piece of equipment in the system. For instance, where any part of a given system will only hold 4,000 lbs., and the load being placed on the system is 1,000 lbs., the safety factor is then 4:1. The NFPA recommends a 15:1 safety factor.

Self-Belay: A prusik attached to a lifeline and clipped into the sit harness during a rappel protects against a rappel mistake, but does protect against a rope or anchor failure.

Screw-Link: A link similar to a carabiner; however a screw-link screws together. They are positive locking and do not flex under tension. They stand up to force in any direction, including three-way loading when screwed closed.

Sheave: The wheel of a pulley.

Shock Load: The impact force exerted on a system, anchor, rope, etc. in the event of failure of any piece of equipment. A shock load is often several times what the original force (load) was because of momentum. This is why shock loading is to be avoided as it could cause total and complete system failure.

Side Loading: Creation of an unsafe force upon a non-load bearing area in a given piece of equipment, which usually refers to force at the non-axial sides or gate of a carabiner; however, brake bar racks and pulleys can be side loaded, too.

Sit Harness: An adjustable harness made from the emergency rescue strap.

Sling: A short length of webbing tied into a loop.

Software: Equipment that is not metal such as rope, webbing, and rope bags.

Spine: The long straight side, (the strongest part) of a carabiner.

Square Knot: Two opposing overhand knots tied together. A square knot can be easily tied incorrectly.

Stokes Litter: Generic term for Department litters. There are several different types of litters throughout the Department.

Stopper Knot: A figure 8 knot placed at the end of a rope to insure that nothing will slide past it.

Tagline: Attached to the foot of the stokes litter to keep the litter from spinning or to maneuver the stokes litter around object.

Tandem Prusik Belay: Used on the belay lifeline to back up the mainline in case of failure. It consists of two 8mm prusik loops cut from lengths of 54 and 66 inches and is attached to the belay line with three wraps. This is generally used with a load releasing hitch for additional shock absorption.

Tie-Off: The physical tie-off of a brake bar rack or figure 8 descender in a lowering or rappel situation, not to be confused with a lock-off.

Travelling Pulley: A pulley that moves during a raising operation. The mechanical advantage can be determined by the number of travelling pulleys.

Vectoring: Applying a sideways force on a tensioned line, amplifying the force at the ends of the line, used for back tied anchors.

Water Knot: Overhand follow through bend that joins two ends of webbing together to form a loop or sling.

Webbing: One-inch nylon woven strap that is sewn tubular and pressed flat during manufacture.

Whistle Test: A test rescue teams use to determine the inherent safety within a rope rescue system. The whistle test simply asks if any one person operating a station in the total system let go, would the rescuer and/or victim be killed or injured. (See critical point test.)

Whiteboard Analysis: The detailed analysis of a rope rescue system in search of weaknesses or flaws by the rescue team leaders. Rescue team testing would be performed after a thorough whiteboard analysis. Two tests for the whiteboard analysis are the whistle test and the critical point test. (See whistle test and the critical point test.)

Working End: The part of a rope that is held fast; the anchored end.

Z-Rig: Another name for a 3:1 mechanical advantage system, shaped like a “Z”.