

The Tech Troglodyte

A Journal of the VPI Cave Club, Student Grotto of the National Speleological Society

Prospective Member Guide

This Trainee Trog is hereby dedicated to the memory of our favorite landowner, Mr. "Buddy" Penley, who passed away in 1992 but is still greatly missed. It's unfortunate that new VPI cavers will only have the opportunity to meet the man through photos, videos, and stories, and we should never forget him. The club still enjoys the fruits of our long standing relationship with him, his family, and neighboring landowners. He was the inspiration for the VAR Landowner Appreciation Award, which memorializes him. Keep him in mind when you're caving in Bland County.



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Vice President Message

Welcome to the VPI Cave Club, Student Grotto of the NSS! We are one of the oldest clubs on campus, as well as one of the oldest caving grottos, and the first student grotto of the NSS. We have members who have been caving for a short time after finding us at Gobblerfest, to those who have been caving many times longer than I've been alive, and now you. You are now a prospective member of the VPI Cave Club. This means you have been meeting people, attending meetings, going underground, and now want to become a full member.

As of now, you have only been led through caves by full members. Within this Tech Troglodyte are the guidelines for safe caving, and advanced techniques. You will learn how to rig ropes and use them in caves. You will learn about good quality gear, and what will leave you in the dark. Even with all the information in this Trog, the best way to learn is to get out there, talk to people, and go caving.

As the Vice President, I am here to help you. I will make sure that there are always trips to go on, and that you will continue to learn new things. If you ever need me, I will be at meetings early to teach a wide variety of skills needed for membership. Meetings will always be Fridays at 7pm in Smyth 146. If you cannot make it, then feel free to contact me or any other members and we will help you out.

As you continue caving, you will get to see beautiful underground formations, hear old stories from the old farts, find and survey unexplored caves, and maybe just make a few friends along the way.

Be Safe, and Happy Caving!

Nathan Kearney
Vice President 2018-2019
VPICAVECLUB.ORG

Letter from the Editors

Hi! First of all, we're sorry this took so long. We wanted to get it right. We hope that the 2018-2019 class of trainees gets good use out of this edition of the Trainee Trog and that you all help keep the VPI Cave Club caving hard, partying hard, and thirdly, being very safe.

The purpose of this guide is to give you some idea of what you're getting yourself into, and to provide a better resource than Google when you have questions. Not everything in here will be right or best - in fact, some of it will probably soon be proven wrong. We want to encourage you to question what you're told. Do research, especially for vertical, about strengths and forces and materials. Learn techniques from anywhere you can get them, but don't trust things you don't understand or people you haven't seen have their shit together.

Why should you pay attention to what we say? Reading this guide is a pretty good shortcut to what we as an active membership have learned about technique, equipment, and caving in general. We can't distill everything we know (or think we know) into print, but this is our best effort. The VPI Cave Club has set standards for caving technique and excellence just about as long as American caving has been a thing. If you train a fair bit and **cave a lot** and read sometimes, you've got a decent chance of continuing that tradition. Read this guide every day with breakfast (as Eric recommends) and you might not sound like an idiot when people ask you questions, which is the best any member can hope for.

If we made mistakes, please tell us; Reilly's email is posted above and she would love nothing better than to "dialogue" with you about it. We'd like to thank Lee White for checking some of the technical details; feel free to blame any errors on him. If this guide was helpful, chalk it up to luck, good teachers, the active membership, and a few too many reads of Alpine Caving Techniques.

Sincerely and vertically,
Phillip Moneyhun, VPI #451, President 2017-2018
Reilly Blackwell, VPI #461, BAT 2017

Welcome to VPI from the Safety Committee!

Caving is very safe if done correctly. The Safety Committee makes sure that we, as a club, are as safe as possible underground. We accomplish this two ways: By making sure that prospective members are learning everything they need to know to cave safely and by encouraging safe caving practices throughout the club.

You are taking care of the first part for us! By getting this manual and sign off sheet you have entered the World Famous VPI Membership Training Program! All the membership requirements you will be scrambling to get signed off in the coming months or years are for one purpose: to prove that you can take care of yourself underground. This means that you can cave safely and responsibly. This doesn't mean that you know everything or are capable of going to every part of every cave in the world. A big part of caving safely is knowing your limits. As you gain experience, your limits will grow. Once you get your membership, you can start leading trips. You will then have a new set of limits to worry about: the limits of the people you are leading and the limits of your ability to lead them. You probably shouldn't start out with a 10 person Boy Scout trip to The Canyon Section.

The second role of the Safety Committee to help make sure that all of our trips are as safe as possible. The Club Constitution states that "All group members should be satisfied with rigging before it is used". Notice it says all group members, not all full members. This means everyone on the trip. The reason for this is simple. Everyone has a voice when it comes to safety. If the rigging doesn't seem right, say something. Discuss it, retie it, and if the group can't come to an agreement, turn the trip.

As prospective members, pay attention to safety issues while on a trip. If something doesn't seem right, say something. If someone on the trip is struggling, help them out or let a member on the trip know. If a member or anyone else is being unsafe, tell them. You can also privately talk to me or anyone else on the Safety Committee after the trip. We are not out to get anyone in trouble. People make mistakes. Cavers sometimes disagree about what the rules are. We only want to solve the issue and make sure everyone is being safe. That being said, if someone knowingly and/or repeatedly is being unsafe, we are going to give that person a hard time.

The Club goes on a lot of caving trips. Although we have very few serious injuries, we do have the occasional close call or minor injury. The Safety Committee collects information about these incidents so we can learn from them and avoid repeating them. So let me know if something happens on a trip. Again, we are not out to get anyone in trouble. This is a very safe club and we would all like to keep it that way.

The VPI Cave Club takes safety very seriously. Just count how many time I said "safe" or "safety" in this letter. It's 21. Seriously though, I would trust any VPI Member to take any close friend or family member of mine caving. I look forward to adding you to that list of trusted VPI Members.

Cave Safely and Carry a Heat Source,
Chris Garguilo
Safety Chair

Basic Caving Considerations

Signing Out

Before your parents drive themselves crazy with thoughts of you getting stuck in a cave for days on end¹, explain to them that we have a strict sign-out system. Sign-out is the process of letting someone reliable know in writing where you are going and what time you will be back. If you are not signed back in by the specified time, a rescue party will come looking for you under the assumption that you are lost, injured, or something has gone wrong. VPI takes sign-out times very seriously - a rescue party will already be assembling if your trip is not back when your time is up, so we always give ourselves a few hours of buffer time.

The VPI Cave Club provides a sign-out sheet posted at a local caver's house. The sheet includes the names of participants, location of cave, date, time leaving town, ETA, check back, length of trip and comments. The sheet is closely monitored to ensure sign-out times are honored.

Example:

Date	Cave	Full Names of All Participants	ETD	ETA	Initial When Back	# of Hours	Comments
1/9/2018	Links	Philip Balister, Phillip Moneyhun, Philip Schuhardt, Phil Fansler, Tyrone Phillips	2 PM	8 AM 1/10			

- Be sure the sign-out sheet has all of the necessary information:
- Full names of all participants.
- Phone number of trip leader.
- Cave name and location. Most caves are well known and there is little question about where they are. New or obscure caves present a problem. Leave a map at the sign-out if possible. If you want your cave to remain a secret, leave the map in an envelope.
- ETA. This is the time you expect to arrive back into town. This includes travel time, getting organized, cleaned up, drinking a beer, getting lost, drinking a beer, and signing back in. If you miss your ETA, we assume the worst and call out a search party to come looking for you. We will attempt to contact you at your house first (sometimes people forget to sign back in). Do not be too liberal on your ETA because if something does happen, you may be miserable for some time.
- If someone was hurt or something went wrong on your trip, it is your duty as a member to make a report to the Safety Chair as soon as possible. Your report should cover what went wrong, who was there, and how the problems were solved. This is necessary if you miss a signout.
- Do not forget to sign back in AND return all borrowed gear (especially club gear). It is a good idea to get in the habit of doing this. All club gear should be returned cleaned and

¹ Pro tip: tell them you went caving after you get back from the trip. Don't tell them beforehand.

More-Pro tip: Don't ever tell them you spend your weekends dangling 100 feet up on a centimeter-thick piece of nylon.

repaired. If a piece of equipment was damaged on your trip, please notify sign-out that it needs to be repaired.

- The sign-in and sign-out times should be reasonable. Do not have an ETA between midnight and 8A.M. if you're using the VPI Sign Out board. To avoid confusion, please put "noon" or "midnight" instead of "12:00 A.M./P.M.". Military time is good.
- Once you get back into town, a simple "initial" in the box is all that is necessary. It is always fun to leave the time of trip and a comment. Be creative!
- A rescue callout is a very serious matter. People will drop whatever they are doing to join the rescue effort. They may risk their jobs or miss important activities. Talk of a rescue may cause the landowner to close the cave. If you miss your ETA for some reason other than a legitimate need for rescue, you will be very unpopular.
- Be considerate of the sign-out residents. They provide a valuable service to the caving community. Consider inviting them along on your trip. Do not dump carbide or other trash at sign-out.

Conservation

Caves are a non-renewable resource. Caves and their inhabitants are extremely fragile and sensitive to changes in the environment. Human activity can easily upset the natural balance in a cave, causing far-reaching changes. For example, if loud, frequent traffic in a cave chases away a population of bats, other organisms that feed on the bat guano will perish.

Everyone who enters, be they frat boys, boy scouts, vandals, or highly skilled and responsible cavers, affects the cave in some way. Certain changes to the cave during exploration are unavoidable. We trample paths into the dirt floors, and we slowly polish the rocks in a pinch. It only takes one careless trip to drastically change a bright, untouched and beautiful passage into a dusty, tired, and worn-looking thoroughfare. The only absolute way to preserve a cave is to just not go there.

Cavers see the value of cave exploration and mapping. The best compromise is to go caving while keeping in mind a very basic understanding: even with the greatest of care, you WILL change the cave as you pass through it. Try to minimize your impact and preserve caves before the harm begins by following the guidelines below.

- Make sure that everyone on your trip, especially novices, understands the need to treat the cave gently, and has the skill and knowledge required to actually do so.
- Leave the bats in peace. Avoid waking them, especially in winter, by moving quietly through the rooms and not shining your light on them at close range. Repeatedly waking bats from hibernation depletes their energy reserves, severely decreasing their chances of surviving until spring.
- If you are moving from a WNS-positive area to a WNS-negative area, you should decontaminate your gear (information on how to do this is available online). Respect local decon guidelines when caving internationally and out of state.
- Stay out of streams unless it is unavoidable. Remember that crayfish, salamanders, and other critters are very difficult to see, especially after the water is muddied by the cavers in front of you.
- Avoid touching the formations, whether live or dead, whenever possible. The dust and mud on your clothes, and the oils on your skin, can halt or change the growth of live formations and may ruin the looks of any formation. Be especially careful when moving

through a passage with low-hanging soda straws and other pretties. Studies suggest that it takes an average of 120 years for one cubic inch of a speleothem to form.

- Do not remove any wildlife or formations from a cave, and do not intentionally break any formations. Not only does this damage the cave and ecosystem, but it is also illegal! Many states have laws against this and enforce it by severe fines or jail time. In Virginia, the law is the Virginia Cave Protection Act and is often cited in signs at cave entrances.
- Stay on the main trail where others have gone before you, especially in sensitive or fragile sections of the cave. Most of the caves you will visit have been traveled many times before by other cavers; look for “elephant tracks” to guide you.
- Clean up any trash you generate, and pack out any trash you find along the way. If it isn’t your trash, carry it out anyway. Others are less likely to leave trash lying around an already clean passage.
- Be careful not to spill carbide rocks and dump, and clean up anything you do spill. Always pack out your carbide dump.
- Take care of all bodily functions before you enter the cave, and pack out what you cannot hold until later.

Landowner Relations

Most of the caves in this area are located on private property, which means it is a PRIVILEGE, not a right, to explore these fascinating places. For most of the caves, many cavers have invested countless hours in establishing a relationship or friendship with the landowner. Some landowners do not have a preference for who visits the caves, others are very strict on their policy, and others are somewhere in between. Please be considerate of the landowner’s wishes, because one person can ruin the privilege for the entire caving community.

- We throw Banquet to thank and celebrate our landowners, as well as to get together and party.
- Many landowners like the idea of having cavers map their caves, and often we will name features and areas after them. Some do not want their caves to be mapped, and we must respect that.
- Be kind, clothed, and considerate.
- **If you don't know, don't go!** Before you visit a cave, ask a member about the proper policy for visiting the cave. These policies are constantly changing, sometimes to the point where it is hard to keep up with the latest information. Always ask active cavers before contacting landowners; sometimes they would rather not be bothered.
- Leave gates as you find them. If it was closed and locked, open it, pass through, close and lock it behind you. If it was open, leave it open. The last thing a farmer wants to do is chase down his cattle on a Saturday night because of an open gate.
- Respect the grass and crops. Some of the landowners make a living off of livestock, which feed on the grass. Do not destroy the grass. Do not spin your tires in the grass.
- Some caves are listed as bat hibernaculums by the state and are off-limits during the winter months (often October 1-April 30).
- Double check for litter just before you leave. Clean up after yourself and others who may have carelessly left some litter behind.
- Do not dump spent carbide anywhere on the landowner’s property.

Basic Safety

Virginia caves are commonly ~55 degrees year-round and typically damp. We cannot stress enough the importance of keeping warm and wearing layers that you don't mind getting muddy. When you first start caving, you should be sure to wear sturdy shoes, preferably boots, and to bring a pack with food, water, extra clothes, and extra sources of light (you need three total). Lights and helmets will be loaned to you by the club, free of charge. Once you arrive at the cave, the following points plus a few on conservation (the "safety talk") will be presented to you by your leading member, and if you're trying to attain membership, you should be prepared to present them.

- Do not cave alone.
- Caving should be fun. If it's not fun, please tell us and we can fix the problem for you or take you out of the cave.
- Tell us immediately when you get cold. We understand that many of you are adventurers and are thus prone to sucking it up when you're uncomfortable. Please don't brush it off as insignificant when you start shivering. Because we're far away from help, hypothermia is one of the biggests safety concerns for caving. Luckily, members are well equipped to help you so long as we know we need to help.
- Maintain three points of contact while climbing. Your helmet and your butt do count.
- Never jump in a cave. The floor may be less stable or farther away than it looks. You also can't guarantee you can climb back up something you've jumped down.
- If you drop something, yell 'rock!' If you ever hear someone yell 'rock,' don't look up.
- Don't look up.
- Seriously.
- If you get nervous about a climb, you are always welcome and encouraged to ask your leading member for a webbing belay. Meanwhile, if a member requests you take a belay, you are required to do so.

As long as you remember these guidelines and follow your leading member's instructions, you will be safe underground. Those driving to and from the cave will also appreciate it if you bring a change of clothes and a trash bag to transport muddy clothes in for the drive back to Blacksburg. As a courtesy, you should offer to help the driver pay for gas, particularly on trips to more remote caves.

Hypothermia

Hypothermia is a general cooling of the body core when more heat is lost than is produced (this is known as *exposure*). The most common causes are wet clothing (they lose much of their insulating value), wind (it cools the body by evaporating moisture from the clothes), inadequate clothing, caving to exhaustion, and combinations of these situations. As your body temperature gradually lowers, your cognitive ability diminishes, and you may not realize you are in danger. Without treatment, hypothermia leads to death. Cavers in this area are especially susceptible to hypothermia since cave temperatures are low and many caves are wet and muddy. Keep an eye on your fellow trip members; if someone is displaying any of the warning signs below, take immediate action. Remember that the hypothermic person is not thinking clearly, so you must decide what treatment steps are necessary.

The best way to prevent hypothermia is to minimize exposure. Don't sit for too long on the cave floor; if

you start to feel cold or begin to shiver, get up and move around. Sitting on your pack or gloves adds a barrier between you and the heat-sucking cave. Eat something to provide your body with extra energy to generate heat; drink enough water to stay hydrated. If eating and a barrier are not enough, raise your core temperature by creating a heat tent with a trash bag and a heat source. When getting wet in a cave is unavoidable, plan in advance by wearing appropriate clothing and bringing extra clothes in a sealed bag. In stream crawls, keep your chest out of the water. In short, keep yourself as warm and dry as possible, and give your body every advantage to staying energetic.

Warning Signs of Mild to Moderate Hypothermia

- uncontrollable shivering
- vague, slow, slurred speech
- memory lapses, confusion, incoherence
- immobile or fumbling hands
- frequent stumbling; lurching gait
- drowsiness
- apparent exhaustion; inability to get up after a rest

Treating Mildly Hypothermic Cavers

- encourage more activity
- get the patient away from the wind and water
- strip off all wet clothes and get the patient into dry clothes
- give the patient warm drinks, but do NOT give alcohol, caffeine, or nicotine
- be sure the patient eats so he can recover his energy
- protect the patient from heat loss to the cave floor using packs, rope or other available material
- use a heat tent to limit exposure
- if exposure cannot be reduced and/or the patient is not warming up, leave the cave!

Treating Moderately Hypothermic Cavers

- if patient is having difficulty moving safely through the cave or has become exhausted, get him into a sleeping bag or heat tent
- add heat to the head, neck, chest, and groin for most effective warming (spent carbide containers make good heat packs if you have such a thing)
- leave the cave AS SOON AS POSSIBLE after the patient has warmed and recovered enough energy to cave safely
- send for help after 20 min if the patient is not able to move safely on their own

Warning Signs of Severe Hypothermia

- disorientation and confusion
- physical activity is uncoordinated
- shivering has stopped
- stupor or unconsciousness leading to coma

Treating Severely Hypothermic Cavers

- **evacuation - call a rescue**
- keep the patient awake
- you may help the patient drink warm drinks, but due to the risk of choking, give nothing by mouth if the patient is extremely disoriented or uncoordinated, or semi-conscious
- place the patient in dry clothes (or naked if all clothes are wet) in a sleeping bag or heat tent and add heat packs to his head, neck, armpits, and/or groin
- protect the patient from heat loss to the cave floor using packs, rope or other available material
- the use of "skin-to-skin" heating by a warm caver is not routinely recommended if the arrival of additional resources is hours away. The warm caver may soon become a second hypothermic patient.

General Thoughts on Hypothermia

- Feed'em, Heat'em and Beat'em (aka tasty snacks, plastic sacks, and jumping jacks)
 - Feed'em - a cold caver can not generate heat without energy; consume as many calories as possible
 - Heat'em - raise the temperature around the caver with a heat tent at the first signs of hypothermia

- Beat'em - moving under their own power will generate heat and is always faster than a rescue when it can be safely accomplished
- Hypothermia progresses quickly from mild to severe; do not delay treatment!!
- Severe hypothermia is RARELY a survivable condition; act quickly and deliberately
 - Call for help EARLY if you need it. A life may depend on YOUR decision.

Credits

- Article from VPI Cave Club web site used for February 2001 edition.
- Article re-written by Steve LePera for Fall 2001 edition.
- Article re-written by Steve LePera for Fall 2002 edition with input from assorted rescue geeks.
- Edited with minor additions by Dr. Eric Stanley 2-2017

Caving gear

You have presumably gone on your first trip by now and have some grasp of what basic gear you need. Don't be the person who forgets their change of clothes. While a helmet and light are the two most essential pieces of caving equipment (it's possible to cave wearing those and nothing else!), here's a basic list of what you should have in your pack and on your person in a cave, with explanations where appropriate.

Footwear

Let's start with your feet. They should be in something that gives you the most traction in a muddy, slippery environment. For most people, this means a pair of boots. Things to look for in good caving boots are; aggressive tread, comfort (would you want to wear them for 12 hours?), water-resistance (not crucial, but Wellies are popular for a reason), and an acceptable price (you will destroy them eventually). Note: you do not want "speed hooks" on your boots; they snag on things (rope, cable ladders, etc.) and are generally less durable.

Clothing

What and how much you wear varies based on how wet the cave is and how long the trip is. You will eventually find what works for you. While you do that, remember that you want your choices to be warm when wet. Fabrics that meet this criteria include wool and synthetics (polypropylene/polyester/wool underlayers are *necessary* for long trips). If it gets wet, wearing cotton around your torso can make a caver cold very quickly. For mostly dry caving, cotton pants (jeans) are usually an acceptable choice based on wear resistance and low cost. However, you should still consider wearing a base layer under them that IS warm when wet.

The insulating value of a typical dry piece of clothing will be mostly a function of trapped air, and a smaller function of the actual material. If your clothing is completely soaked, its insulating value is mostly a function of the trapped water, over 20 times worse than it was dry! The advantages of modern fabrics are that they do not hold as much water, and they dry faster.

The retained moisture percent is defined as the amount of water a completely dry fiber will absorb from the air at a standard condition of 22° C and 65% relative humidity. It is expressed

as a percent of the dry fiber weight. If you get soaked and wring out your clothes, this is about the percentage by weight of the clothing which will still have the insulating value of water (over 20 times worse than before). The lower this number is, the warmer you will be. Although caves are not 22 °C and 65% relative humidity, the data below clearly show the superiority of modern synthetic fabrics over natural fibers with respect to retaining good insulating properties after getting wet.

These numbers are for heat conduction. Once you are wet, the convection of evaporating water will dramatically increase your rate of heat loss (unless you are wearing some kind of vapor barrier such as a plastic suit).

Air	1.0	Acrylic	8.0
Polypropylene	6.0	Polyamide	10.0
Silk	7.0	Viscose	11.0
Polyester	7.0	Cotton	17.5
Wool	7.3	Water	26.0

Relative thermal conductivity of common clothing materials of equal thickness.

Gloves

Not everyone wears gloves underground; some people choose to be wrong. Gloves can keep your hands warm and most will give you better traction when you climb. When picking a pair of gloves, consider: price (caving will kill them sooner, not later), fit, compatibility with rope work, and toughness. It is not a bad idea to have separate gloves for horizontal and vertical caving. Leather gloves provide excellent heat and abrasion resistance for rappelling, but are extremely slippery when wet. Popular caving gloves are rubber/nitrile coated gloves (think gardening or dishwashing gloves).

Caving Pack & Contents

Caving packs are essential gear beyond your first few trips. A lot of trainees use whatever they have on hand, but backpacks and the like have major disadvantages. Here are some considerations when buying a dedicated pack: closing mechanism (something that will still work when muddy; zippers and velcro do not), wear resistance, size (usually as small as you can go and still fit your gear), and ease of carry.

- Food and water. Consider the trip length. A clif bar and a bottle of water will be plenty for your first few trips, but if you're going to the back of Mammoth (the world's longest system, located in Kentucky) that won't be enough.
- 30' of 1" Tubular webbing. It is light, compact, and good for rigging, seat harnesses, and top belays. It is also good for arm rappelling into pits that you probably can't climb back out of.
- First aid/emergency kit. In a cave, hypothermia is the primary concern. This should include a lighter, a long-burn candle, and a trash bag or safety blanket, which will allow for the construction of a heat tent. Hand warmers are a popular comfort item, but are not effective hypothermia treatment/prevention. Gauze and duct tape will help address any

cuts, scrapes and breaks. Drugs, including pain relievers, antihistamines, water treatment, and pills for handling the shits are also strongly recommended. Try to follow the law when choosing your drugs.

- Extra light and batteries. This should be a reliable light that is powerful enough to cave out on. Batteries should be kept fresh and dry. Consider getting flashlights that all work off the same style of battery.

Helmet

At some point, you'll want to buy your own helmet for comfort or convenience. Most any rock climbing helmet will work. If you can, try on a few different styles before you buy one. Ask members if you can try theirs at training sessions. Caving helmets should have a hard shell. A ebbing suspension style helmet is generally preferred over foam suspension. EPP foam is often rated for multiple impacts and is preferred over EPS foam. Avoid sun visors at the front because they limit visibility in a cave.

Lights

Likewise, you'll eventually want to buy your own lights. Primary considerations are brightness, ruggedness, and affordability, both in purchase price and running cost. Lights powered by rechargeable 18650 lithium-ion batteries are extremely popular and highly recommended, especially Zebralight headlamps and similar models. Ask around for light recommendations, as technology is constantly evolving.

Logging Hours

Once you decide to pursue your membership, you will need to start logging your hours spent underground. A log sheet can be found in this trog or on the VPI website and will be required at your membership vote-in. You must log at least 40 hours to be eligible for membership, and a full or associate VPI member must be on the trip for it to count toward your hours. Most new members have been caving for somewhere around 100 hours and have been around for more than one semester, but there are always exceptions.

We encourage trainees to bring their log with them every time they go caving (but not into the cave!) so members can sign off on hours immediately. If you forgot your log and can't remember the date you went into the cave, you can check the sign-out sheets for old records (they are regularly posted on the SIVTAC site). This requirement should be easy as long as you don't procrastinate.

Elementary Climbing Skills

The elementary climbing requirement is based on you and your leading member's confidence in your ability to safely and efficiently navigate a beginner to intermediate cave. Feats that will gain you a signature vary from member to member. Trainees commonly ask a member if specific climb will count just before or after they do it, though occasionally a member will offer to sign after taking a trainee through a particularly difficult cave. Repeatedly pester the members about whether various climbs count to keep your ego in check.

The techniques you'll need to go on advanced trips can only be gained through experience. No, your rock climbing experience doesn't count. As you continue to develop your personal technique, take care to not just muscle your way through the cave. Members will sometimes encourage you to 'cave softly,' or to cave as gracefully and efficiently as possible so as to not disturb the physical environment around you or waste unnecessary amounts of energy bruising yourself. Learning to cave softly will be especially beneficial once you start going on long, physically demanding trips or surveying virgin passage. Remember that if you're constantly doing pull-ups during up-climbs, your technique could probably use some improvement. You are also encouraged to develop your own style of caving that works for your body type and personal preferences. Feel free to explore different methods and routes as your climbing improves - you don't always have to follow the person in front of you.

There are a couple techniques and principles you need to understand. First and foremost, friction is your friend. To maintain control and move efficiently, you want to maximize your friction. To arrest a slide, lay down and spread out to maximize contact with the ground. Second, a fundamental caving technique called "chimneying" involves climbing between closely spaced parallel walls. This is accomplished by pushing against the walls in any number of positions. For example, you could be pushing against one side with your back and the other side with your feet or knees, or your feet and hands at either side, or anything else that seems to work. Try to find "pockets" in the wall that you can hold on to or slip a foot into. Alternatively, push perpendicularly against a slightly sloped wall.

Once you feel you're ready to get signed off for elementary climbing, get on a trip with advanced elements. Common passages used for elementary climbing tests include the Devil's Staircase in Newberry-Banes, the passage immediately following Double Wells in New Castle Murder Hole, an entire Links trip unassisted, and the down-up climbing combination in Hess' Hollow in Pig Hole. Of course, the successful completion of any of these does not guarantee you a signature, and members will often sign off for the completion of climbs not listed here.

It's important to remember while taking this test to never try to badass your way through a climb that you're uncomfortable with. If you feel unstable and unable to recover on your own, please ask for help. While there is absolutely no shame in failing a test and learning from the experience, the club will probably be pretty peeved if we have to rescue you. At the end of the day, this test is meant to encourage trainees to develop effective technique and to become familiar with their personal limits. Your priority should always be the safety of yourself and those around you.

Vertical Caving

Seat Harness

The standard seat harness used by all VPI Cavers, which was perfected by Jim Washington in the mid 1980's, is tied using a single length of webbing and results in a safe and effective harness that can be tied relatively quickly. Most cavers carry 30 feet of 1-inch tubular webbing, although 20-25 feet is sufficient to tie a seat harness on the average caver. There are many variations of seat harnesses that can be tied, but the VPI Seat Harness has been chosen as the standard because it provides redundancy such that cutting through any single point on the finished harness will not result in failure. Many of the webbing harnesses described on the internet will fail if the webbing is cut at any point.

To tie a VPI Seat Harness you will need 20-30 feet of one inch tubular webbing. Using an excessively long piece is not recommended, as it only makes tying and untying more complicated and time consuming. Tubular webbing can be purchased from the club store.

1. Find the center of the webbing (marking the center with sharpie or tape can help). Place the center point of the webbing in the middle of your back just above your hips. Bring the ends around to your front and tie a square knot. The webbing should be snug, as the harness will loosen slightly when weighted.
2. Bring one end around the outside of your leg, then up between your legs and underneath itself and the waist strap.

	
Step 1	Step 2

3. Bring the webbing down in front of the waist strap and leg strap, then underneath the leg strap (toward your crotch), leaving a bit of loop.
4. Feed the end back through this loop to create an overhand

	
Step 3	Step 4

5. Repeat Steps 2-4 to tie the other leg strap
6. Squat down and ensure the leg loops are snug against your body. Work the webbing through the overhand knots until the leg loops are snug, but never tighten any part of the harness to the point of cutting off circulation.

	
Step 6	Step 6 continued

7. When you stand up, the leg loops will be tight. Be careful not to pinch any sensitive areas. The leg loops must be snug at the top of your leg, or the harness will become very uncomfortable to climb in as it loosens up.
8. Take one end of the webbing and pass it behind and around your back, then tie a square knot where it meets the other strand of webbing at your side, this should form another strap around your waist with the knot located at your hip.

	
Step 7	Step 8

9. Repeat step 7 using alternate ends of the webbing until all of the webbing has been used. Most cavers try to finish with the last knot on the opposite side from where the rope will run while rappelling.

	
Step 8 continued	Step 9

10. The last square knot should be backed off around all loops (except the leg loop) and the tails can be tucked into a pocket. When finished you should have a minimum of two wraps around your waist, if you do not then use a longer piece of webbing.
11. Place your carabiner or quick link (maillon rapide) around ALL the pieces of webbing at the front of the harness. Appropriate carabiners and quick links can be purchased from the club store.

	
Step 10	Step 11

Additionally, you can buy harnesses designed for caving (rock climbing harnesses don't work well). After climbing on webbing harnesses for a cave or two, you will see the benefit of one.

Belaying

A belay is a redundant safety system used during rope work or climbing that prevents major injury in the event that a caver falls or goes into an uncontrolled rappel. It is important for the person on belay to stay alert and be ready to give instruction that will ensure the safety of the person on rope. Belay are strongly encouraged on VPI trips while climbing cable ladders, and are recommended during dangerous climbs/maneuvers.

In general, remember:

- Anyone who wants a belay gets a belay.
- If a member asks you to take a belay, you must accept it.
- Always wear gloves.
- Both the belayer and climber must be careful to not allow too much slack in the belay line.

Bottom Belay

A bottom belay is the most common type of belay used by the VPI cave club. The person giving a bottom belay holds the bottom of the rope being rappelled on and weights the rope in the event of an uncontrolled rappel (Fig 1) so as to place additional friction on the rappel device. The belayer should *never* be in rockfall. If the rope is too short to belay safely, the belayer should attach a piece of webbing or another rope to the bottom. If there is no way to safely belay, no belay should be given. On a longer rappel, there will be more rope stretch (and the rappeller starts out with more rope weight), but a very effective belay can still be given by attaching an ascender to the rope and running away, thus changing the rope angle and eliminating much of the rope stretch. Belay are typically given by a more experienced member on the trip. Belayers should always wear gloves and a good helmet.

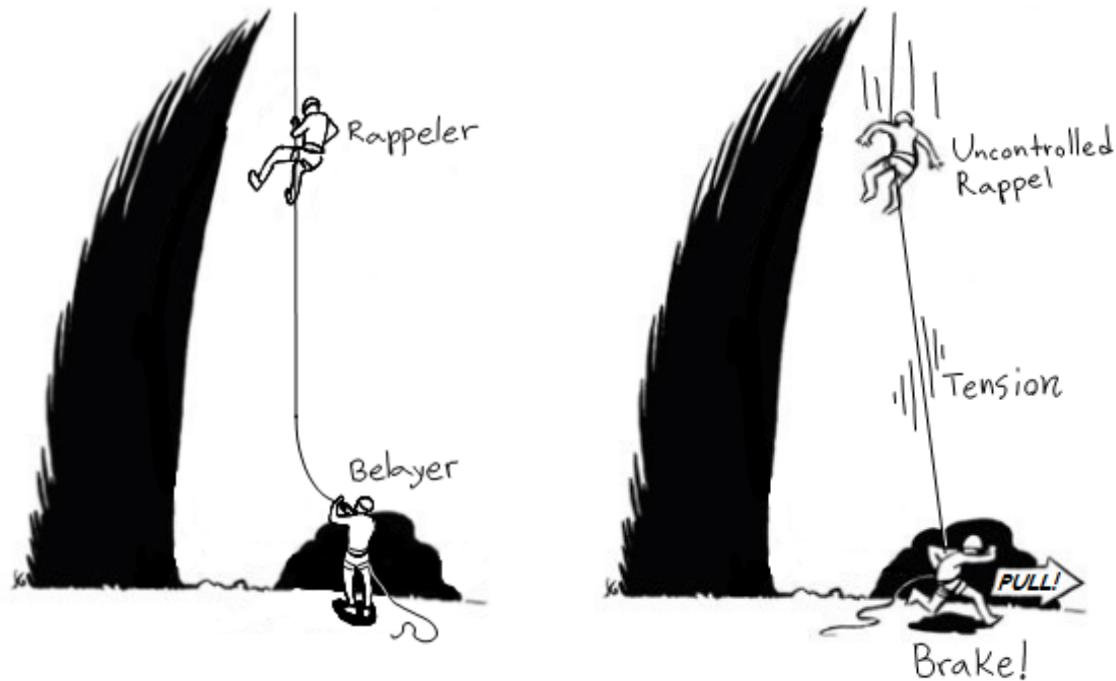


Figure 1. Belayer tensions rope during an uncontrolled rappel

Any time a bottom belay is given, the following calls should be used to ensure the safety of the rappeller.

Signaller	Command	Meaning
Rappeller	On Rope!	I am approaching the ledge and getting on rope.
Rappeller	Ready to rappel!	I am safely attached to the rope.
Belayer	Belay is on!	I am in position and ready to belay.
Rappeller	Rappelling!	I am about to rappel.
Belayer	Rappel away!	I am expecting you to rappel.
Belayer	Belay is off!	I am no longer giving a belay.
Rappeller	Off rope!	I have detached from the rope and am out of rock fall
Rappeller	Falling!	I am falling, catch me.

Always:

- Stay out of rockfall.
- Concentrate on the rappeler; do not talk or be distracted by other cavers.

Many people will use the call “On rope!” when they are in a place at the top of the pitch where rockfall might be a concern for the cavers below, or when they begin to interact with the rope/start to rig in. This is not an official VPI call, and not all trip leaders will use it, but it is worth using in any pit where there is high risk of rockfall, and sometimes to just communicate with the cavers at the other end of the rope.

Top Belay

A top belay should be used when climbing anything that feels unsafe or when climbing a cable ladder. Top belays should never be used for vertical work (SRT). A top belay can be given with rope or webbing attached to the climber’s harness. If a harness is unavailable, the climber can be secured using a bowline on a coil (see knots section), but is not recommended and should only be used when absolutely necessary. Both the climber and the belayer need to be alert and ready to respond to each other so that the climber does not have to fight the belayer.

All belays must be anchored to a secure rigging point. If a body belay is used, the belayer must be securely attached so that they are not pulled from their position when catching a fall. Body belays are less ideal when the climber is clearly larger than the belayer. In such instances, a munter hitch or another belay device can be used. When giving a belay, under no circumstances should the brake hand of the belayer leave the rope. Figure 2 shows how to safely take up rope slack during a body belay and how to stop a fall. Note how the brake hand never leaves the rope so that the belayer maintains control at all times. In the event that the climber becomes unresponsive to calls, the belayer should lower the climber as safely as possible to the ground, after informing them that they are about to do so.

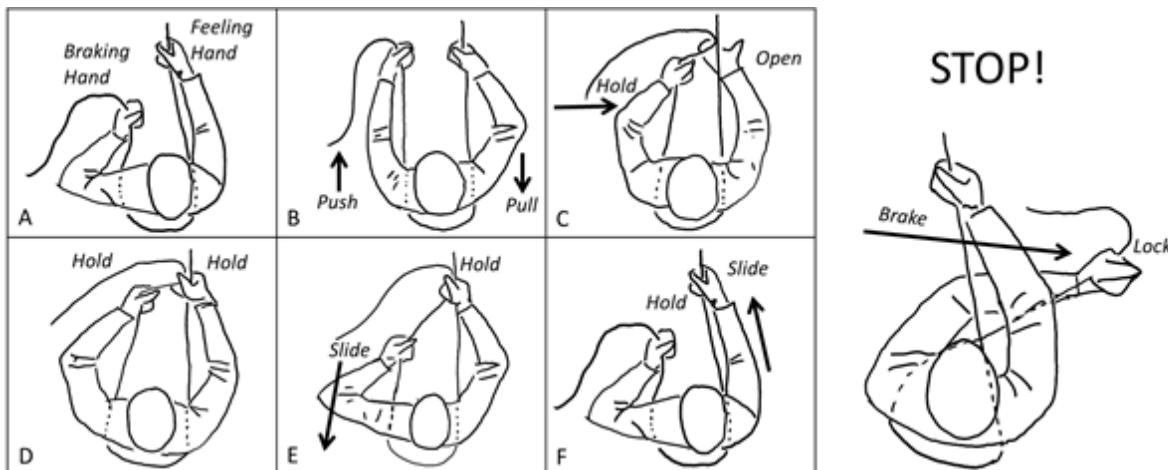


Figure 2. How to safely reduce rope slack and brake against the body during a body belay

Any time a top belay is given, the following calls should be used to make climbs safer. Ensure that both the belayer and climber are familiar with the calls

Signaller	Command	Meaning
Climber	On rope!	I am about to attach to the rope

Belayer	OK!	I will stop kicking rocks down the pitch
Climber	Ready to climb!	I am safely attached to the rope.
Belayer	Belay is on!	I am in position and ready to belay.
Climber	Climbing!	I am about to climb.
Belayer	Climb away!	I am expecting you to climb.
Belayer	Belay is off!	I am no longer giving a belay.
Climber	Off rope!	I have detached from the rope and am out of rock fall.
Climber	Falling!	This needs no explanation.
Climber	Slack!	I want more rope so that I can move freely.
Climber	Tension!	Pull the rope tight. DO NOT say "Take up slack."
Belayer	Slow!	Climb more slowly
Belayer	Stop!	Stop climbing

Always:

- Be sure you are solidly anchored before starting the belay.
- Have enough rope or webbing to lower the climber to the floor or other safe location in case of emergency.
- Keep the belay tight as communication may be poor between the climber and the belayer.

Self-Belay

Self-belaying is a technique that is employed on climbs or cable ladders where a fixed rope has been rigged alongside. A self-belay utilizes a rope grab (mechanical ascender or climbing knot) that the climber moves up the rope as he climbs.

- You should never fall on an ascender. They are designed for fall prevention, not fall arrest. Do not employ this technique if you cannot maintain tension between yourself and the ascender on the rope.
- Bring a spare ascender or prusik so that you can switch to ascending the fixed line if you need to.

Rappelling and climbing rope, climbing on knots

Rappelling

Many of the local caves require SRT (single-rope technique) to fully explore. We refer to these as vertical caves. The basic skills required to go to these caves are rappelling and climbing rope. Both of these will be taught to you at the club's vertical training sessions, and learning these skills at one of the vertical sessions is required before your first vertical caving trip.

Rappelling is the act of going down the rope. The overarching premise of good rappelling technique is to remain in control at all times. Most rappel devices (descenders) allow the user to remain control with just one-handed operation. When many people start off, they have a tendency to grab the rope with their free hand above the descender. While this sometimes helps with comfort and stability, it is not necessary. That free hand can usually be put to better use helping the caver navigate the drop or more smoothly operate their device.

There are many different kinds of descenders. Those most commonly used by cavers are the rack, figure-8, bobbin, and micro-rack. Each have advantages, disadvantages, and nuances to their use. Talk to someone who can teach you the nuances of the device if you are planning to use it. Rappelling is one of the most dangerous things we do in caving, and you should have a solid understanding of your device and its operation before acting as an independent member on a vertical trip.



A figure 8 and a j-frame rappel rack with hyperbar

As a member, you will need to know how to safely rappel on and lock off all of these devices, even if you do not use them yourself, so that you can ensure the safety of the trainees in your care. As you pass your rappelling and changeover tests, you should become very comfortable using your chosen descender. All descenders should be attached with carabiners that are locked and screwed down.

Figure-8

Figure-8s are light, compact, and cheap. Many people rappel for the first time on an figure-8.

- Figure-8s are safe to use on drops up to 150'. They don't have enough variability to use on longer drops; at the top you'll be struggling to move, and at the bottom you'll lose control.
- Brake on a figure-8 by changing the angle of the rope, wrapping it around your butt, or squeezing the rope. Rappel gloves should always be used with a figure-8.
- Figure-8s twist and kink the rope. If you go vertical caving a lot, consider buying another kind of descender.

Rack

The rappel rack is the most common and versatile descender used in caving.

- It is safe to use on drops of any length; most people will use an 18+ -inch rack on drops over 400 feet.
- The biggest danger with a rack is “zipper rigging,” or putting the rack on the rope so that the rope pushes the bars *off* the frame. This can be avoided by using racks with U-shaped bars and making sure the rope runs over the curved sides, as well as always rigging with the open side of the frame to the right and bringing the rope *over* the first bar/hyperbar.
- The second big danger with a rack is “Sudden Accidental Disconnect,” in which the rack, when unweighted, twists in the carabiner and sits on the gate. Upon reweighting, the rack can break the gate off of the carabiner and detach from the harness. This can be avoided by using a screwlink to attach racks, and being vigilant about checking the rack connection before rappelling.
- The proper way to control speed with a rack is to jam the bars together, or add a bar if necessary. Changing the rope angle or squeezing the rope to brake are not instances of good rack technique. Therefore the hand *on the bars* is your “brake hand,” and you should have a hand on the bars at all times.
- Five or more bars should be used when going over a lip, to prevent a three-bar rappel.
- “Feeding” a full size rack (pushing rope through from the bottom of the rack) is acceptable to some extent (usually to get moving) but should not be necessary if you have good technique. If you do it you need to be very careful to push only the minimum amount of slack; large bights can cause you to drop two bars at once. Be especially careful feeding at lips.

Micro-rack

A micro-rack is a small u-frame rack, often with one or two hyperbars. There are long and short frame versions. The long are more versatile, since you can brake by moving the bars as you would on a rack.

- *Never feed a micro rack;* the center bar(s) can come off, leaving you with essentially a three-bar rappel.
- Micro racks are safe to use up to 200' drops.
- Many lighter cavers find that a short frame micro is not usable on old/stiff/muddy/glazed rope, which will be the majority of the rope you rappel on. A long frame micro or a bobbin is a more versatile alternative.

Bobbin

A bobbin uses two fixed spools and often a braking carabiner to control rappel speed. They are often used in alpine technique and are less common in the States. Some have an auto-braking feature included. These are not for novices, and bobbins in general are not recommended for people who are new to ropework.

- The most basic rig for a bobbin is to insert the rope in the shape of an S between the two spools so that it comes out the top of the bobbin, and then to run it through a separate braking carabiner.
- Brake on a bobbin with braking carabiner by changing rope angle *upwards*; the opposite of braking with an 8.
- If the rope is too stiff to S-rig, a C-rig is an alternative with less friction. *Never bottom belay a C-rigged bobbin; this can cause it to break open, leaving the user in a free-fall to*

the bottom. Trainees, who always get bottom belays, should not C-rig bobbins. If you do end up *having* to use a C-rig, communicate before using it with the person who will be belaying you. Feeding an S-rigged bobbin is not the worst thing in the world, and it's preferable to an uncontrolled rappel with no possible belay.

- Never use a quicklink or small carabiner to attach a bobbin to your D-link. When unweighted and weighted again it can twist and open the gate, leaving the bobbin unattached to the rope. The safest way to handle this is to use only the carabiners which Petzl recommends for use with their bobbins.
- “Old-style” gates - stamped metal instead of plastic - should generally not be used. They can “stick” open and appear to be closed, resulting in potential freefall after the device has been visually checked and a successful test rappel has been completed.
- Choose brake carabiners carefully; if they are the size of regular biners, the bobbin can become trapped in them if a bottom belay is given. If a large brake biner must be used, clip it into the rappel carabiner and not the d-link.

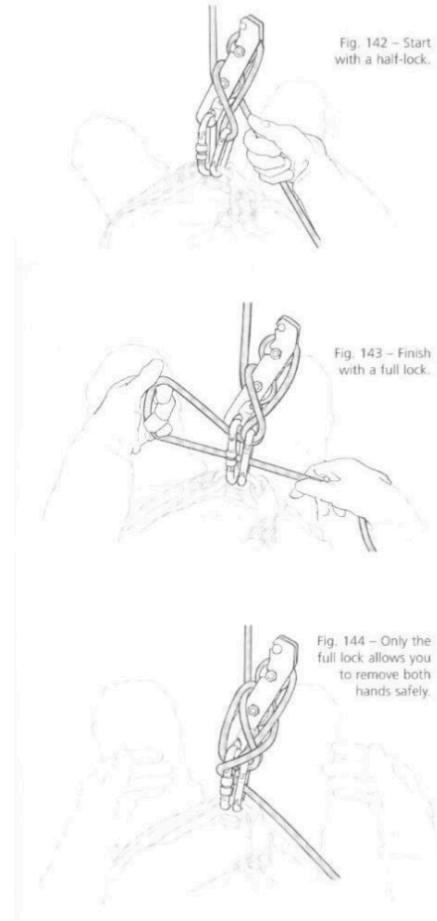
Reference: Futrell, Andrea, and Bill Storage. “Lori Cori Cave Accident Analysis.” NSS News, June 2005, pp. 10.

Locking Off

When rappelling, you need to know how to stop and stay stopped. To do this you must learn how to “lock off” your descender; a “soft lock” is safe to use as long as your hand is on the descender or the rope, holding everything in place. A “hard lock” means it is safe to take both hands off the descender.

- Figure-8
 - Soft lock: Grasp a bight of rope and cross it between the mainline right above your figure-8 and the figure-8 itself.
 - Hard lock: After soft locking, run the bight down to your d-link (or biner when using a webbing harness). Pass the bight through, and tie an overhand knot around the mainline and above your figure-8.
- Rack
 - Soft lock: If the rack does not have a hyperbar, cross the rope over the standing line between it and the top of the rack, just as you would with a figure-8. You may have to stomp on the rope to unlock it. If you have a hyperbar, a soft lock is one wrap around the hyperbar *with your hand on the rack, holding the rope in place*.
 - Hard lock without a hyperbar: Same as with an 8. This will suck. A carabiner can be used to substitute for the hyperbar if you don't have one.
 - Hard lock with a hyperbar: Take a bight of rope and pass it around all the bars. Instead of tying an overhand, twist the loop once or twice and hook it onto the hyperbar. Cinch this loop down before letting go of the rope.
- Micro-rack
 - Same as with a rack, or with a figure-8 if the micro rack doesn't have a hyperbar.
- Bobbin

- Soft lock: Pass the rope between the left edge of the bobbin and the rope, looping it halfway around the bobbin. For a Stop, the rope goes under the handle before passing over the bobbin.
- Hard lock: After soft locking, pass a loop of rope through the braking carabiner and loop it over the bobbin again. If you are using an autolocking bobbin, a soft lock is sufficient to “hard lock” the descender. Do not hard lock an unweighted bobbin; if suddenly weighted it can damage the bobbin.



Climbing

The other essential skill for SRT is climbing rope. Rappelling is the easy part; climbing is the hard part. There are many systems by which a caver can ascend rope, the most commonly used mechanical options are the frog, texas, ropewalker, and others. Only frog will be covered, as it is the most common and most versatile.

The option that you will most likely be introduced to is not a mechanical system - the club teaches new cavers how to climb rope “on knots”. The premise is that three pieces of small diameter (~6 mm) accessory cord will be secured to the caver - one on each foot and then the third attached to the harness. You must have three points of attachment when they are not all attached to your harness. These cords will be attached to the climbing rope using one of several

climbing knots, typically a helical. These knots can be pushed up the rope, but will not come back down it when pulled. By alternately advancing the knots at your feet and the knot at your chest, you will climb up the rope one squat at a time. There are a few good pointers that will make this process easier.

1. Learn to tie your knots! There is a huge difference between well-tied and poorly-tied knots - even if they're both safe one will be much easier to push up the rope.
2. Focus on getting your feet underneath you and stepping up with your legs. It's much less tiring than pulling your body up with your arms.
3. Advance the knots by pushing up from underneath. If you grab the climbing knot directly, it is likely to unlock and start sliding down the rope. This can result in a situation referred to as a 'heel hang', where the top knot slips down until it is stopped by the bottom knots. It is a difficult position to be in. Be mindful of where you are putting your hands!

Frog Systems

When you get the rappelling and climbing rope requirements signed off, you may end up using a borrowed frog system or, if you're lucky, your own frog. The frog system uses two mechanical ascenders with toothed cams that grab the rope, as well as a foot loop, a chest harness, and two "cow's tails" (essentially two lengths of rope with carabiners attached at the end). Usually people will buy a sewn caving harness with buckles that, unlike a climbing harness, closes with a D-link/central link,. To get on rope, you attach the chest ascender, which rigs directly to the central link of your harness, jump, and pull the rope through until you can sit on the chest ascender. If your chest harness is adjustable, tighten it until it is pulling the chest ascender upwards. Then, attach your top ascender (often a handled ascender) to the rope as high as you can. Step in your foot loop and stand up, pulling the chest ascender up. Sit on the chest ascender, unweighting the top ascender, and move it up as high as you can. Repeat until you're up! As with knots, there are some pointers that will help this process go smoothly.

1. Learn good form and try to always frog with good form. Good form means that you have your feet under your butt as much as possible and that you are *not* repeatedly doing pull-ups to stand in your foot loop. All energy exerted horizontally is wasted. Try to extend your legs straight down.
2. A chest harness that holds you close to the rope makes for more efficient frogging. Bungee chest "harnesses" are light and convenient, but do little to keep you close to the rope. If you become incapacitated on rope you will flop backwards.
3. Learn to "self-start" by holding the rope between your feet as you stand up, moving the chest ascender up the rope. Most of the time you will need to do this until you've climbed far enough up the rope that the chest ascender will feed on its own, at which point you can move the rope to run between your legs. This mainly has to do with the weight of the rope below you.
4. Make sure your system is tuned well. This means that your foot loops and cowstails are the right length (many people attach the long cowtail to the top ascender).
5. We recommend cowstails made of dynamic rope. They can be tied to suit the user, cost \$10 or less, and function the best (in terms of strength *and* convenience) of all available options.
 - a. The carabiners should be secured with barrel knots (double overhands).

- b. The short cowtail should have a nonlocking carabiner. If you use the long cowtail to attach your top ascender, that carabiner should be locking.
- c. The center knot between the two cowtails should be an overhand, a figure 8, or an alpine butterfly.
- 6. A frog system is more complicated than knots and has more moving/mechanical parts. Double- and triple-check that carabiners are locked, d-links are closed, and buckles are backed off. Check yourself and the cavers around you - especially those who insist they don't need to be checked.

An excellent resource on the Frog system can be found here with more details on tuning, equipment, and operation: <http://www.johncharleswoods.com/cavetech/frog.pdf>

Changeover

As one of your membership requirements, you need to be able to demonstrate a safe and effective changeover from descending to ascending equipment and vice versa while on rope. The key to understanding changeovers is having a solid understanding of your gear. Be sure you have a thorough knowledge of how your equipment works before attempting more advanced vertical technique.

Basic rules

There are many different variables that must be considered when performing a changeover such as the climbing system (frog system, knots, rope walker etc.) and the rappel device being used. Do research and talk to more experienced cavers to help figure out the intricacies of your particular system. Before you begin, here are the basic rules you need to remember to pass your test:

- You must always have two points of attachment connected to the mainline when climbing if both are tethered to your d-link, three if they are tethered to you elsewhere. This means you need two for a frog system and three for knots (the two foot loops are attached to your feet and the top knot is attached to your d-link).
- Mechanical ascenders must be unweighted and slid slightly up the rope before they can be unlocked and removed from the rope. Always close the cam after taking an ascender off the rope to keep from damaging the teeth.
- Make sure the rappel device is properly attached and locked off before removing the ascending gear from the rope.
- Double-check your gear every time you change something. It's easy to make mistakes during technical maneuvers.
- Make sure your foot loops and cow's tails are the right length! Practice and tune your system.

Rappel to climb - knots

1. Lock off the descender (see section on locking off)

2. Attach the foot knots below the descender, ensuring that the shorter knot is below the longer one.
3. Attach the top knot above the descender
4. Stand on the foot knots and advance the top knot.
5. Sit, your weight should be on the top knot. Remove the descender and climb

Climb to rappel - knots

1. Sit on the top knot and pull a bight of rope up through the two foot knots. Push down or twist open the knots to allow the rope to feed through them.
2. Attach the descender as high as possible (between top and foot knots) and lock it off.
3. Stand on the foot knots and move the top knot as far down as possible.
4. Sit, your weight should be fully on the descender.
5. Remove the knots from the rope and rappel

Rappel to climb - frog & short descender

1. Come to a stop and lock off the descender
2. Place the upper ascender on rope as high as possible while able to stand in footloop
3. Step up in the foot loop and place the chest ascender on rope above the descender
4. Sit on the chest ascender
5. Remove the descender and climb

Rappel to climb - frog & long descender (rack)

1. Come to a stop and lock off
2. Place the upper ascender on rope at face level
3. Clip short cowtail into top hole of the top ascender
4. Unlock rack; rappel so that the short cowtail is weighted
5. Feed a huge bight of slack through the croll
6. Rig in rack as high as possible and lock off
7. Step up in footloop and unclip short cowtail
8. Lower yourself back down so that the rack is weighted. Take special care to make sure your biner is oriented correctly as you weight it.
9. Test rappel a few inches. If successful, take top ascender off the rope and rappel.

There are two different methods of changing over from ascending to descending on a frog, depending on the length of your descender. The first will work on any descender, but is slower and relies on having a well-tuned system. The second is slightly quicker and easier, but only works on short descenders (not racks).

Climb to rappel

1. Place the upper ascender at face level and clip into it with your short cow's tail.
2. Stand in the foot loops and thumb down the chest ascender until your weight is fully on the top ascender. Pull a bight of rope through the chest ascender
3. Attach the descender as high as possible above the chest ascender and lock it off

4. Remove the chest ascender
5. Unlock the descender and rappel a few inches to test it is attached correctly (do not weight the top ascender). If so, remove the upper ascender and rappel. If not, address the issues.
 - a. If you are unable to remove the upper ascender because your test rappel weighted it, you need to redo the changeover so you can complete your test rappel without unweighting and re-weighting the rappel device.
 - b. If you are unable to remove the upper ascender because you could not rig in the rappel device high enough to deweighting it, try standing in your footloops while you rig it in, or tying a knot in the rope underneath you to stand in.

Climb to rappel - for short descenders

1. Place the upper ascender as low as possible while still able to stand in footloop
2. Attach the descender below the chest ascender, as high as possible, and lock it off
3. Stand in the foot loops and remove the chest ascender
4. Sit, your weight should be on the descender
5. Unlock the descender and rappel a few inches to test it is attached correctly. If so, remove the upper ascender and rappel. If not, address the issues. If you are unable to remove the upper ascender because your test rappel weighted it, you need to redo the changeover so you can complete your test rappel without unweighting and re-weighting the rappel device.

If you are C-rigging a bobbin during this maneuver: wrap the rope around the back of the bobbin and then around the back plate, under the lower spool. Do not push a bight under the lower spool. Really just get someone to teach you this in person; if done incorrectly it can facilitate the gate getting “stuck,” which is very dangerous.

Don't worry if the task seems daunting! It will make a lot more sense once you're on rope and handling the gear yourself. Ask questions, pay close attention and practice. Good luck with the test!

Rigging and Padding a Rope

There are many things to consider when rigging a drop and every drop will present its own unique set of obstacles that need to be overcome. By keeping in mind a few simple guidelines, you can make rigging safe and effective.

Rigging Guidelines

- While rigging, follow a few simple guidelines:
 - Do not step on the rope. Moving rope could catch on you and pull you down a pit, and it can damage or dirty the rope (and is disrespectful to the rope's owner).
 - Try to keep the rope orderly as you rig; rig with one end and then flake (out of a bag or off a coil) the end you feed down the pit so that it does not tangle.

- As you feed the rope down the pit, check it for weak spots, fuzzed spots, and other potential problems. Ropes and cable ladders should be checked every time you use them.
- Lock carabiners and screw them down.
- No nylon on nylon contact in places where the rope will be weighted and mobile.
- Always clip in when getting on rope or working around the edge using either your cow's tails or an ascender
 - Make sure your ascender will not become side-loaded if you fall, which can cause it to come off rope. Additionally, make sure your cow's tail is clipped into something that will actually stop your fall, not just clipped into the rope; in this case, you will just hit the bottom right next to the rope.
- The rigging should allow the caver to easily and safely get on and off rope.
 - The rope should be rigged far enough away from the edge to allow the caver to get on rope without being in danger of falling
- The rig should avoid hazards which may damage the rope or injure the caver.
 - The rope should not run over sharp rocks. Some hazards can be padded, but always try to completely eliminate the danger by simply rigging in such a way that it cannot contact the rope.
 - Always carry enough rope pads, and prioritize your rope pads based on where they may be most effective. Different styles of rope pads will be more effective in different circumstances. Remember that almost anything can be used as a rope pad in an emergency.
 - Always pad ropes as if you intend to climb on them. It is not uncommon to have to climb up a drop that you intended only to rappel down. An improperly padded rope can fail quickly if it is climbed on due to the bouncing nature of frog technique.
- The rigging should be as simple as possible and easily inspected for damage or wear.
 - Simple rigs are safe rigs, and if it looks tidy it's easier to inspect.
- Always tie a foot loop or stopper knot in the end of the rope before passing it down the drop.
 - A double overhand is the best stopper knot; a figure 8 on a bight will also provide a footloop.
 - This will prevent anyone from rappelling off the end of the rope and will make a changeover easier if the rope was too short.
 - The first rappeller (usually the member who rigged) is responsible for untying the knot at the end of the rope once they reach the ground. All members on the trip should double check that it is untied before hauling up the rope so that the knot doesn't catch on anything on the way up.
- Always yell "ROPE!" before passing it down the drop.

Selecting the appropriate rigging point for a drop can be confusing. Often, the best rig point won't be obvious from the top of the pit, and what looks like a great rigging point may place the caver in a dangerous situation further down the drop. Whenever possible, consult with other cavers who may be more familiar with how the cave you will be visiting should be rigged.

Once the rope is down the pit, take a good look at how it runs, over what edges, etc. This is like a preview of how the rope will behave when weighted.

The first person to descend should always be experienced and prepared to change-over and return to the top if the rigging turns out to be unsuitable for any reason. Sometimes it will take several tries to rig an unknown drop correctly.

Common Anchor Types

Trees

- A Friction Wrap or Tensionless anchor is usually used to rig to trees. This rig is favored because the strength of the rope is not compromised by a knot, and it distributes the load over a greater area, decreasing the likelihood of the rope cutting into the tree and killing it.
 - Always pad trees, especially where the main line makes its first bend.
 - Never rig to dead trees.
- Generally, three to five wraps around a tree will provide enough friction to prevent the rope from slipping and tensioning the knot. Smaller trees require more wraps than larger trees or rocks. To test if enough wraps have been made, tension the end that will be rappelled on. If the other end slips, more wraps are required.
- When properly rigged and loaded, the main line should pass straight through the tie off without deviating. The tie off should not have any tension when the main line is loaded.
- When wrapping the tree, the main line should be at the bottom of the friction wrap and the tie off knot should be at the top. This will prevent the loaded part of the rope from crossing itself, causing nylon on nylon abrasion, which is always to be avoided. Carabiners can be used to attach the tie-in knot to the rope so as to avoid nylon on nylon altogether.
- A safety line is shown in figure three. In this configuration, make sure that when the safety line is loaded the intermediate knot (around the main line) will not collapse. An Alpine Butterfly is a great knot for this application.

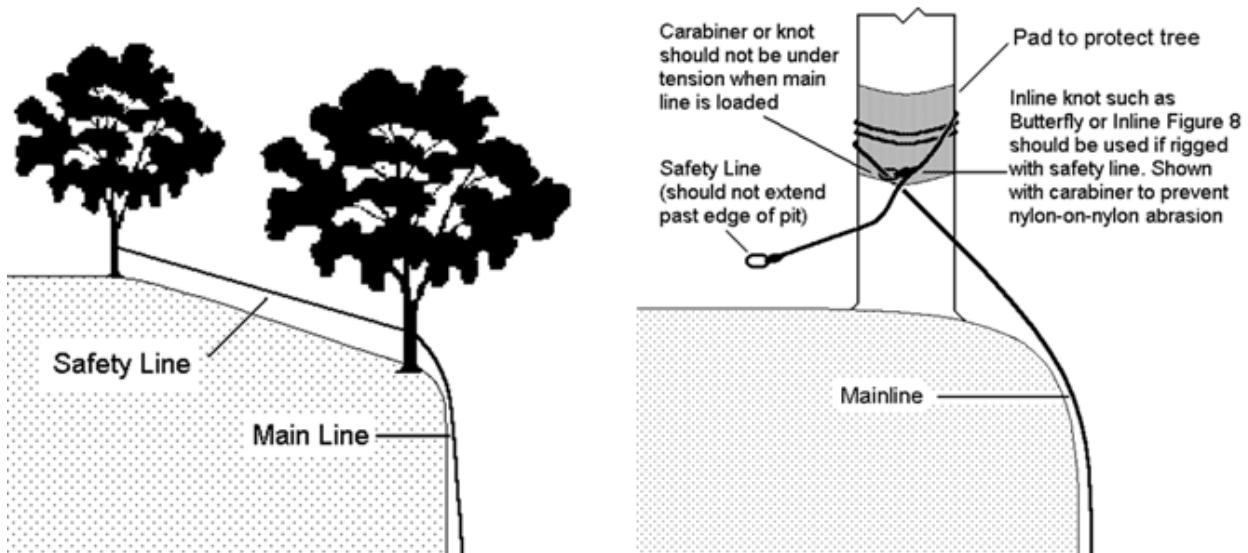


Figure 3. Friction wrap and safety line

Sometimes, the rigging will be done with webbing. This is sometimes done to extend the effective length of the rope. When rigging with webbing, the “wrap 3-pull 2” method is used.

- Wrap the webbing three times around the object and tie off with a water knot.
- Place the knot at the point of least tension by pulling and loading the two loops without the knot.
- Keep the total angle of the webbing at the carabiner less than or equal to 60 degrees.

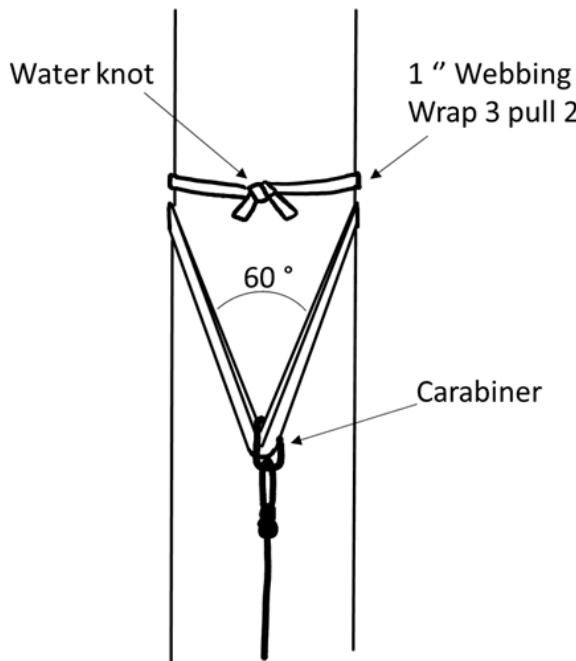


Figure 4. Wrap 3-pull 2 with webbing
Stalagmites & Rocks

- Fixed loops are usually used to rig in these situations. Usually a figure 8 on a bight or a mountaineering bowline knot is tied. A mountaineering bowline on a coil can be used to distribute the load across more area.
 - Never use a friction wrap on stalagmites. The wraps can work their way over the top of the formation which could cause the rig to fail (Figure 4).
- Check for cracks or fractures.
- Be sure the rig point will not move under load.
- Never rig to a stalagmite if there is the possibility of tension being applied in any direction other than downward. If the rig point is lower than you will be when you get off rope, be careful that you don't pull the loop off the rig point.
- Pad all sharp edges.

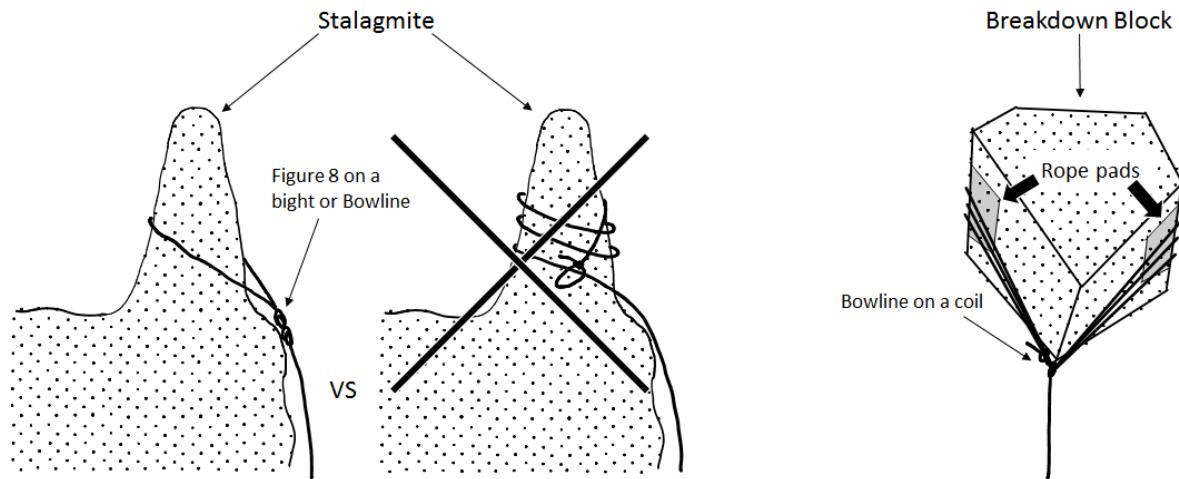


Figure 5. Rigging with fixed loops

Bolts

- Bolts are usually set in pairs. Bolts are usually rigged using a double figure 8 on a bight or a bowline on a bight (Figure 6).
 - When tied as 'bunny ears', each loop is adjusted so that both bolts will be loaded equally when the rope is weighted at the angle at which it will be used. This means they are **sharing** the load (see "angles & tension" for more) and is called **equalizing**.
 - When tied into the self equalizing configuration, the loops automatically adjust to weight both bolts equally, **distributing** the load. If one of the bolts were to fail, the remaining bolt would be shock loaded. Self-equalizing configurations also use more gear unnecessarily. Therefore self-equalizing rigs are not recommended in virtually all SRT applications.
- The third way to rig to bolts is with a figure 8 on the end of the rope and a long alpine butterfly on the other. This should still be equalized properly. This configuration is useful for bolts that are set far apart.

- Always check the integrity of the rig point. Make sure bolts are in good shape and hangers are secure (they should not be able to rotate). Bolts are more likely to fail than giant rocks. Do not hesitate to rig to a natural anchor if you do not have faith in the bolts.

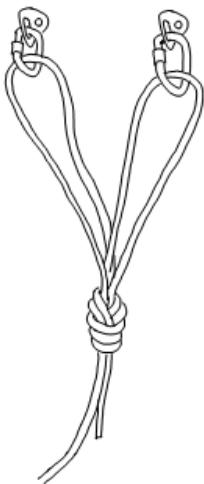


Figure 8 on a bight in 'bunny ear' configuration



Bowline on a bight in self equalizing configuration

Figure 6. Rigging on bolts with a figure 8 and bowline on a bight.

Angles & Tension

The tension in a line between two anchors is related to the angle the rope forms, as shown in Figure 7. The smaller the angle, the more evenly the load is distributed, and the lower the load in the rope. The angle should be about 60 degrees, which is approximately the angle between your pointer and pinky fingers when stretched out making “devil horns”. When the angle is 120 degrees, each line is taking 100% load. At 150 degrees, each line is taking 200% load. As the angle increases past 120 degrees, the tension increases very rapidly. The angle should not exceed 120 degrees, which is approximately the angle between your thumb and pinky when stretched out.

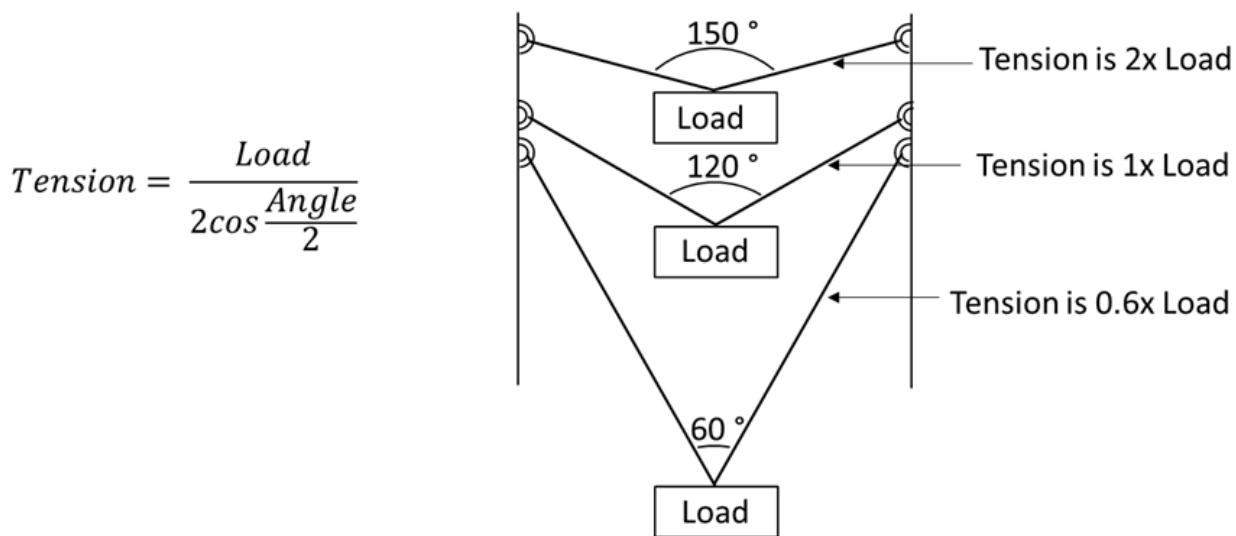


Figure 7. Tension in rigging.

Table of Rope/Webbing/Hardware Strength

Gear		Failure Strength: lbf, (kN)
PMI Static Rope	11mm 10mm 9mm 8mm	6407, (28.5) 5957, (26.5) 4114, (18.3) 3260, (14.5)
PMI Accessory Cord	9mm 8mm 7mm 6mm 5mm 4mm	3327, (14.8) 3214, (14.3) 2675, (11.9) 1619, (7.2) 1214, (5.4) 787, (3.5)
Beal Dyneema Cord	5mm	2697, (12.0)
Tubular Webbing	1" 5/8"	4000, (18.7) 2300, (10.0)
Petzl Croll	Shell Failure Rope Sheath Damage, 11mm Rope Sheath Damage, 9mm	2250, (10.0) 1370, (6.1) 1040, (4.6)
Petzl Basic	Shell Failure Rope Sheath Damage, 11mm Rope Sheath Damage, 9mm	3877, (17.2) 1370, (6.1) 1040, (4.6)
Oval Maillon	10mm 7mm	11020, (49.0) 6060, (30.0)

Black Diamond Positron Carabiner	Gate Closed Gate Open Cross-loaded	5620, (25.0) 1798, (8.0) 1798, (8.0)
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Make sure that the materials you're using are as strong as they should be. Nylon can be damaged by sunlight, abrasion from rocks or other rigging mistakes, heat generated by rappelling, or contact with acid or bleach. Metals can corrode. Bolts may be badly set, loose, or non-stainless.

Knot Tying

The bread & butter of your vertical caving knowledge

Required Knots	Additional Useful Knots
Overhand Knot Square Knot Water Knot Double Fisherman's Bend Bowline Mountaineering Bowline Bowline on a Coil Bowline on a Bight Figure Eight Figure Eight on a Bight Double Figure 8 Alpine Butterfly Helical Prusik Munter Hitch	Mule Knot Double Tucked Sheet Bend Figure Nine Load Releasing Hitch Inline Figure Eight Trucker's Hitch Clove Hitch

Required Knots

An overview

Of the fourteen knots commonly used in the club and required for club membership, the majority are based on one of three knots: four are based on the **Overhand**, two are based on the **Figure Eight**, and four are based on the **Bowline**.

We'll cover these three first before going into the knots based on the overhand, figure eight, and bowline, then finish up with miscellaneous knots and optional knots.

The Overhand Knot

The overhand knot is the simplest of all true knots: it's the knot you've been tying for years, it's the knot that your headphones are tying themselves into in your backpack as you read this.

There are two subtly different ways to tie an overhand knot around another rope as a backoff knot. The two ways are referred to as **Inside** and **Outside** (Figure 8), and are dependent on how the backoff knot is oriented around the main line. In the images below, the inside form is on the left and the outside form is on the right. The inside knot is preferred for being more compact.

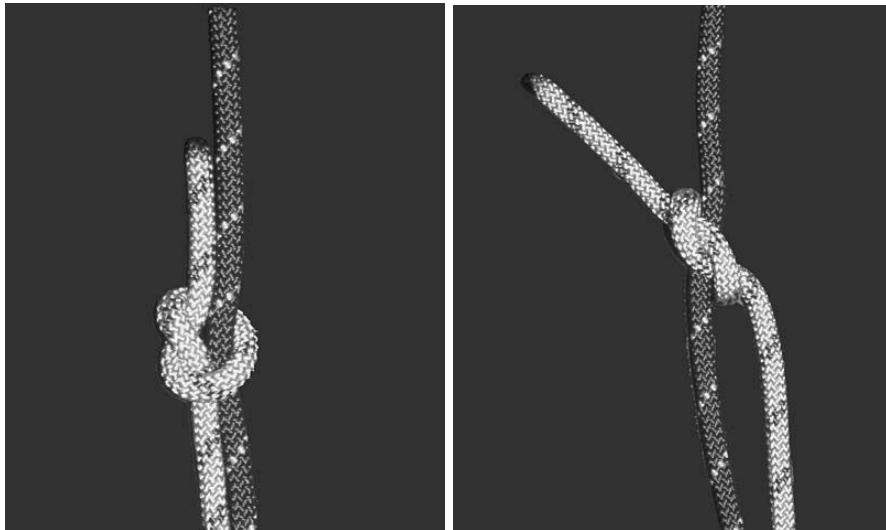


Figure 8. Inside (left) and outside (right) forms of the overhand backoff.

When an overhand knot is tied with two pieces of rope, it's called a **Half Knot** (Figure 9). You may be thinking to yourself, "that's not a knot, it's just rope wrapped around another rope, it unravels if you look at it funny." And you'd be correct. It's a bend, and the first step of several knots to come.

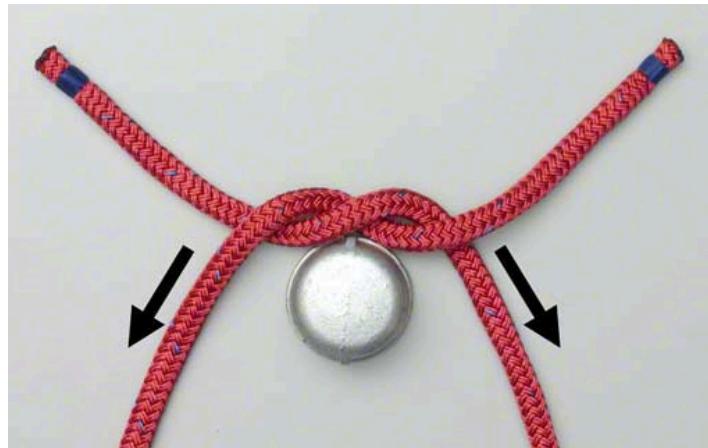


Figure 9. The Half Knot is the first of many different knots.

The most common use of the overhand is to secure or back up a more complicated knot: bowline and overhand based knots are often backed off with another overhand. It is very quick and easy to tie, but is not strong or secure enough for rigging, and is prone to jamming (becoming difficult to untie after it has been loaded).

The Square Knot

The **Square Knot** or **Reef Knot** (Figure 10) is a binding knot, a bend, and a very simple one at that. You learned to tie one when you learned to tie your shoes. It's easy to tie, compact, and can be tied while maintaining some tension in the line. But thinking back to all the times your shoes have come undone should clue you in to how unsatisfactory it is as a bend.



Figure 10. Square knot without backoffs

If the tail and standing part of one of the ropes get pulled, the knot will capsize with one rope forming a girth hitch around the other (Figure 11). If this knot is used as a bend and something snags one of the ends, the knot can capsize easily. The knot will gradually work itself undone if repeatedly loaded and unloaded. The problem is worse if the ropes used are of different size or stiffness.



Figure 11. Capsized Square Knot (left) and Granny Knot (Right)

"There have probably been more lives lost as a result of using a square knot as a bend than from the failure of any other half dozen knots combined." (ABOK page 258).

And this assumes the knot is tied correctly to begin with. The square knot can be easily mistied into two other bends that function far worse. These two knots are known as the **Thief Knot** and **Granny Knot**, respectively (Figure 11).

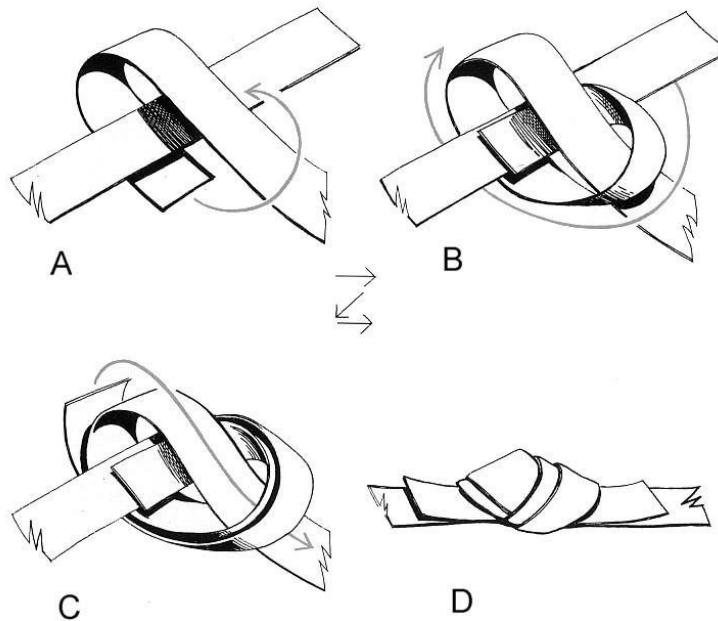
Once you can tie a square knot correctly, you will use it to make rope coils and while tying a webbing seat harness.

Tips:

- The most common way to tie a square knot is to take the two ends of the ropes and tie a half knot right-over-left and then another left-over-right.
- The tails of the square knot should be parallel to the standing parts of the ropes and on the same side of the knot.

The Water Knot

The water knot (or ring bend) is most often used to bend two lengths of webbing together. It is easily tied by tying an overhand knot in the end of one length of webbing and then re-tracing the knot with the end of the other length of webbing. This technique is called a "re-trace" and is also useful with the figure-8.

**Figure 12. The Water Knot****Tips:**

- To tie it properly, it must be dressed so the two strands remain flat and parallel to each other.
- To tighten properly, all strands must be pulled tight independent from each other.

The Double Fisherman's Bend

The double fisherman's bend (or grapevine knot) is a very secure knot that can be used to bend two pieces of rope of similar diameter. It is prone to jamming with heavy loads and can be difficult to remove. With three turns on each overhand, it is called a triple fisherman's bend or barrel knot. The triple fisherman's bend is as strong as the rope and is the only bend that should be used with Spectra/Dyneema. It is very prone to jamming, and does not contain a loop, so if you use it to join two ropes together you must also have a loop (such as an Alpine Butterfly) to clip into.

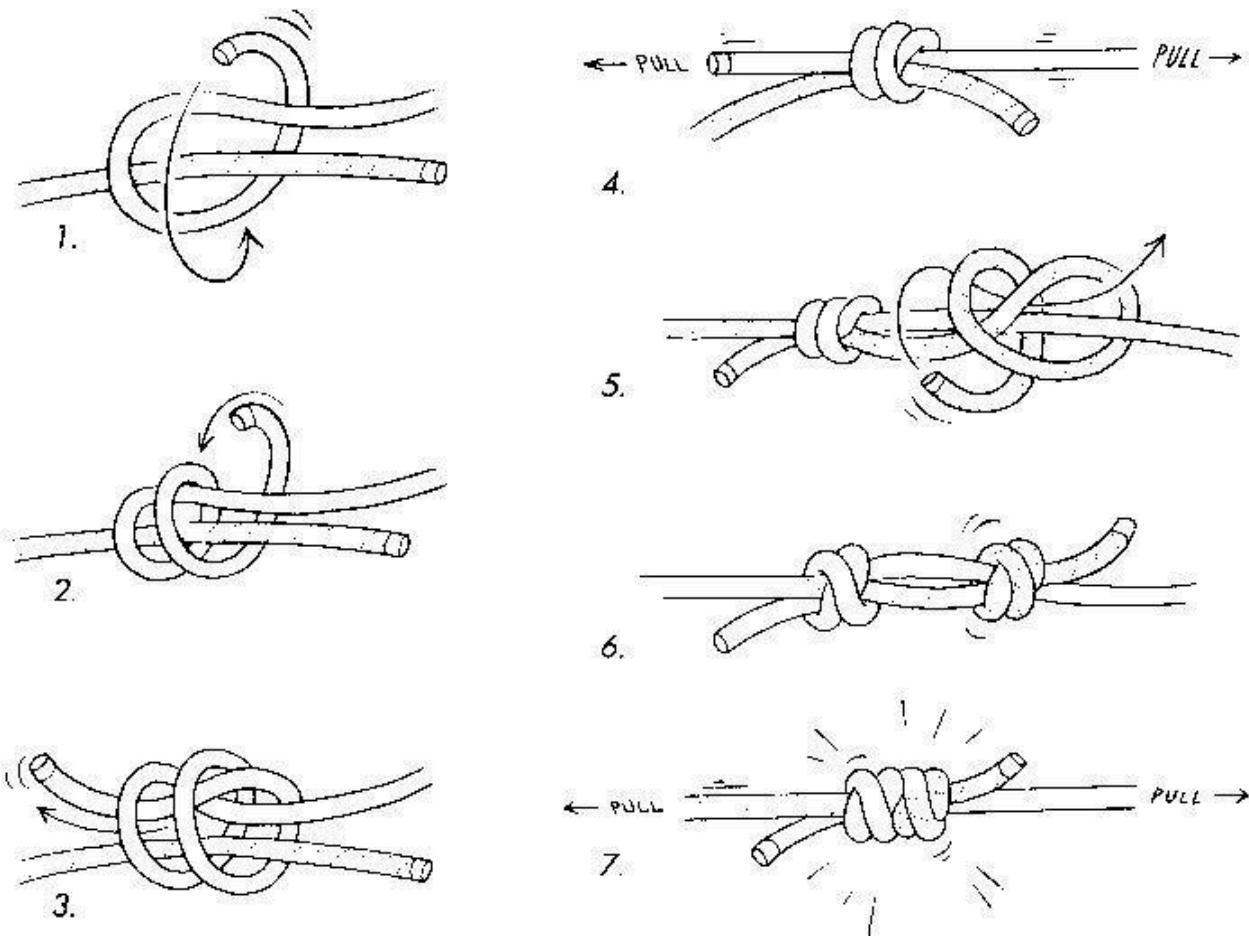


Figure 13. The Double Fisherman's Bend

Tips:

- The “X’s” on both knots should line up and fit together when the knot is aligned.

The Bowline

The bowline creates a fixed loop on the end of a rope. Four of the required knots are based on the bowline (bowline, mountaineering bowline, bowline on a coil, bowline on a bight) and knot texts will show many more variations. This knot is easy to tie, relatively easy to inspect, and not prone to jamming. After you learned to tie your shoes, you should have learned this knot. If you didn't, learn it now. It is quicker and easier to tie than a retraced figure-8, and uses less rope. It also is far less prone to jamming. However, it is harder to inspect than the 8, must be properly dressed (especially with Yosemite backoff), and can be confusing when tied backwards or upside down.

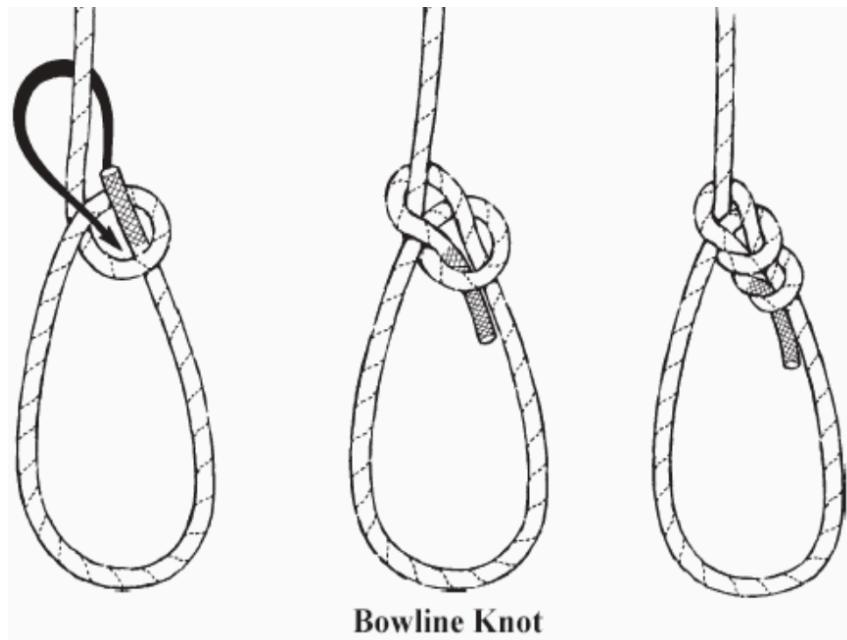


Figure 14. The Bowline Knot with overhand backoff

Tips:

- The free end must have a backup knot. The most common choice is the overhand knot. An even more secure choice is the double overhand knot. A Yosemite tie-off will put the free end of the rope outside of the loop.
- The Yosemite tie-off is harder to check and is unstable. An overhand is simpler and works better in most cases.
- The single bowline can be re-traced to form a knot with the same structure as the bowline on a bight.
- The free end should be inside of the major loop (except with the Yosemite tie-off). Although the "left-handed" form of the bowline is thought to be just as strong as the properly tied version, the free end is more likely to snag on something and capsize the knot into a slipknot.

The Mountaineering Bowline

The mountaineering bowline is identical to the single bowline except that it has two minor loops. One of the backoff methods used for the single bowline should be used with the mountaineering bowline. It is stronger than the single bowline but harder to check off, and more difficult to dress.

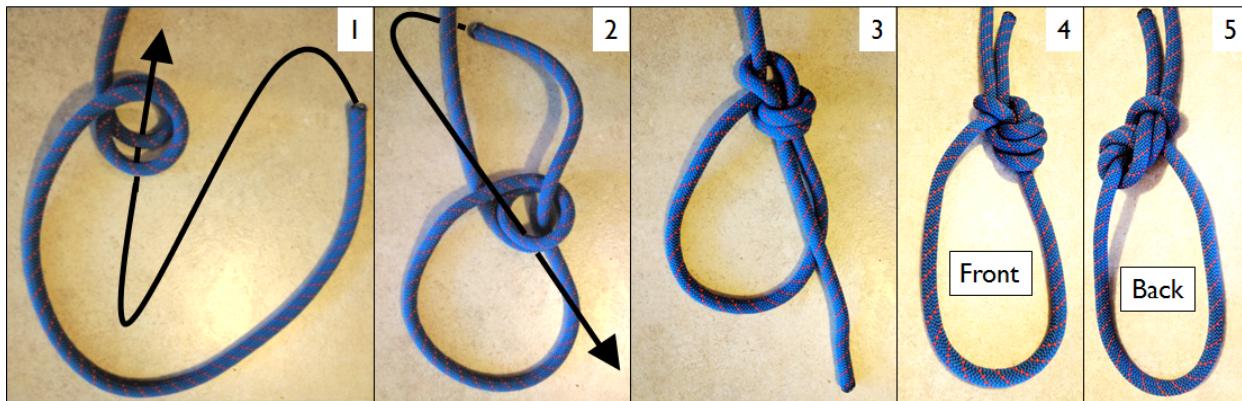


Figure 15. The Mountaineering Bowline with Yosemite Backoff.

The Bowline on a Coil

The bowline on a coil is used to attach a person to a belay line if a harness or webbing is not available, or if you need a quick, easy belay with just rope. It is a bowline with several major loops. The backoff (a single or double overhand) should go around all of the major loops. It is strong and will not cinch around the person it's tied on, but should be adjusted tightly, and will never be comfortable to fall on.

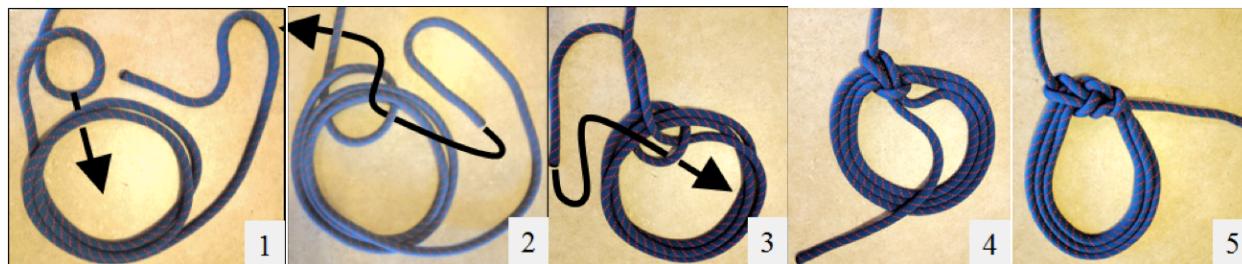


Figure 16. Bowline on a coil with overhand backoff tied around entire coil.

Tips:

- A rope is not a harness. Use this knot only in cases where a harness is not available and no webbing is available to tie a harness.
- This is not a knot to be used in equalizing rigs. All of the coils must be around the same object.
- The orientation of the minor loop and the way the end of the rope passes through it are the same as a regular bowline.
- Tie this “above the boobs,” just below the belayee’s armpits, so that if they fall it will not cinch around their internal organs.

The Bowline on a Bight

The bowline on a bight is a mid-line knot used to create two easily adjustable fixed loops. A backoff is not required.

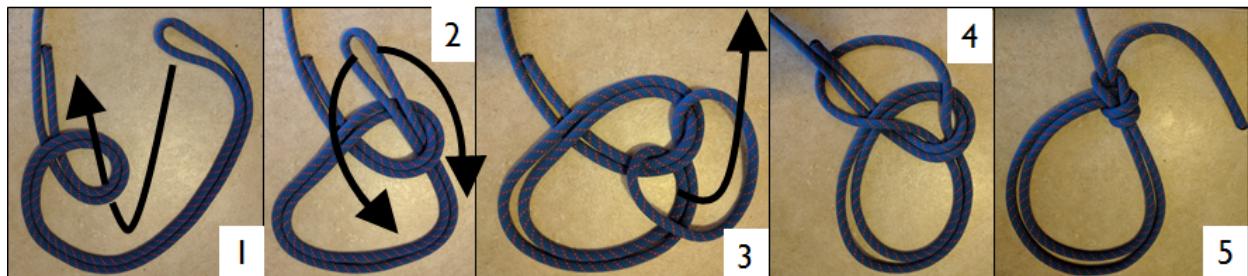


Figure 17. Bowline on a Bight

Tips:

- You can tie this knot around something by tying a single bowline with a long free end around the object first, then re-trace the free end through the knot.
- The relative size of the two major loops can be adjusted.

The Figure-8

The figure-8 knot can be used as a stopper knot (e.g. to prevent a rope from passing through a pulley). Its more common uses are in the forms tied in the bight or re-traced. No backoff knot is required.

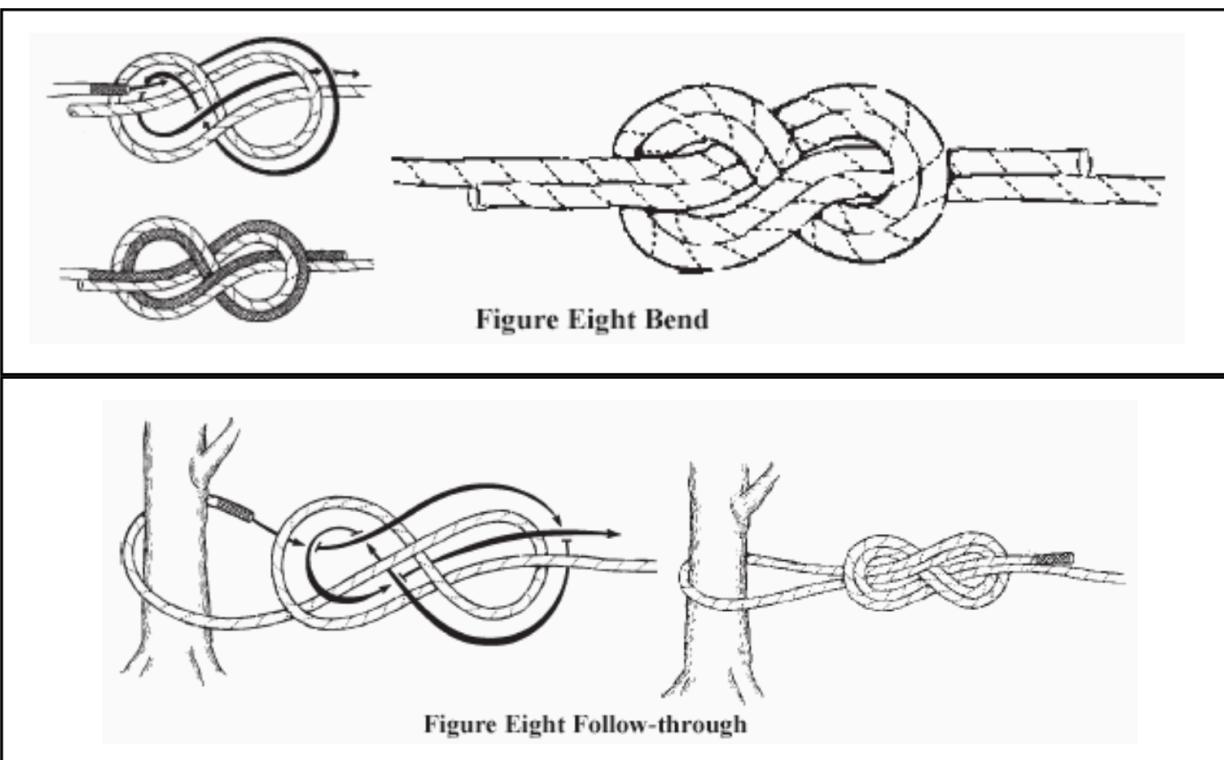


Figure 18. Figure 8 retrace

The Figure-8 on a Bight

A figure-8 knot can also be tied in a bight to form a fixed loop. This knot is usually tied near the end of a rope and used as a main rigging knot. The same knot can be tied by tying a figure-8 in the rope, passing the free end around something, and re-traced the knot. Re-threading a figure-8 with another line will form a figure-8 bend, a very secure knot. This is a popular knot for fixed loops on gear (QAS attachment, footloop attachment, etc) but is not the ideal knot for the carabiner ends of cowtails. Many people use it as a stopper knot on the end of a rope. It is more likely to be remembered and tied correctly than a bowline, and is more stable under loading from different directions. It remains stable after repeated loading and unloading, and is less likely to invert and become untied when pulled across an obstruction or when the tail is pulled. It also retains much of the rope's strength. However, it jams up badly, is hard to adjust, and uses much more rope than a bowline.

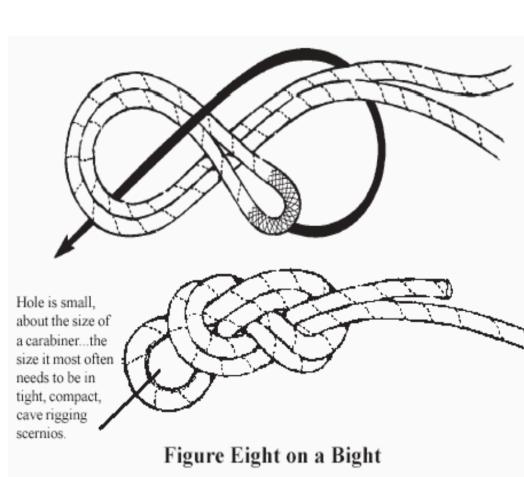


Figure 19. Figure 8 on a bight

This knot does not require a backoff. It does require some attention when dressing; it should **not** be flat when dressed.

Tips:

- Use an alpine butterfly or an inline figure-8 if the knot is to be loaded in opposite directions on both tails, as in the central knot on a pair of cowtails.

The Double Figure 8

The double figure 8 is a knot used when rigging to 2 bolt anchors that need to be used to share the load between them. It's excellent when you need two loops of different sizes to properly equalize the rig. It can be tied either as an End-line anchor knot or a Mid-line knot. Compared to a Bowline on a Bight, it is less prone to collapsing. However it is bulkier, uses more rope, and is slightly harder to adjust loop size.

Tying a Double Figure 8 Knot

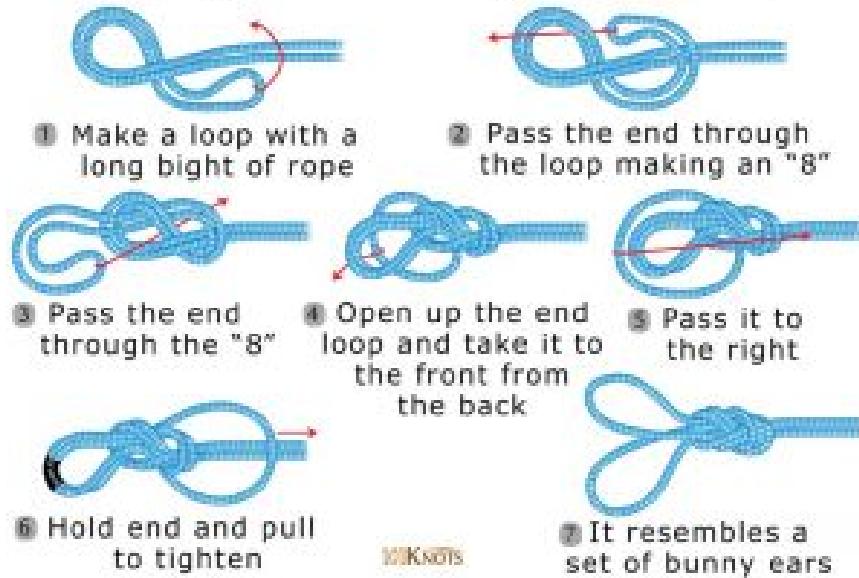


Figure 20. Double Figure 8.

Tips:

- It is possible to self-equalize the rig using an extra carabiner.

The Alpine Butterfly

The alpine butterfly is a mid-line fixed loop. It can be used to bypass a damaged section of rope; two alpine butterflies and a carabiner can be used to bypass a longer section of rope. It is the ideal in-line knot for rigging and other purposes, because it can support a load in any direction without collapsing.

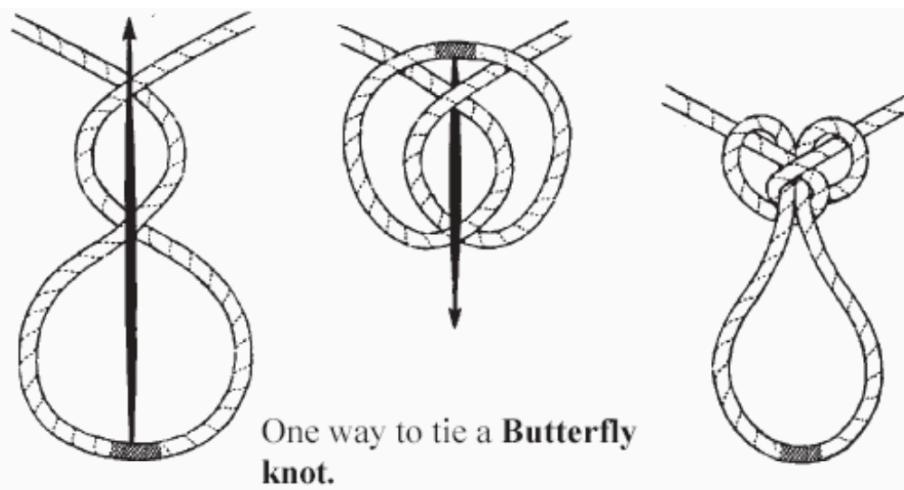


Figure 21. Alpine Butterfly

Tips:

- Look for the dick and balls.
- If you really want to understand this knot and establish yourself as a Rope Nerd, figure out how to tie it *around* something. No cheating with the Internet!

The Helical

The helical knot is a friction knot used with rope climbing systems to attach a smaller sling (6-8mm) to the main line (usually 11mm). When there is no tension on the sling, the knot slides freely. When the sling is loaded (parallel to the main line), the knot grips the rope and will not slide. It can also be used with webbing.

The helical is essentially a few wraps (4-7) around the main line--you will use more wraps (or thinner cord) for added friction on slippery rope. It is secured by a bowline (usually with Yosemite backoff) or figure-8 retrace. It is harder to tie than a prusik but is much easier for climbing because it does not have to be loosened and readjusted to slide up.

Careful attention must be paid to securing the bowline with an overhand knot, or better yet, a double overhand or Yosemite finish. A figure-8 tie can also be used.

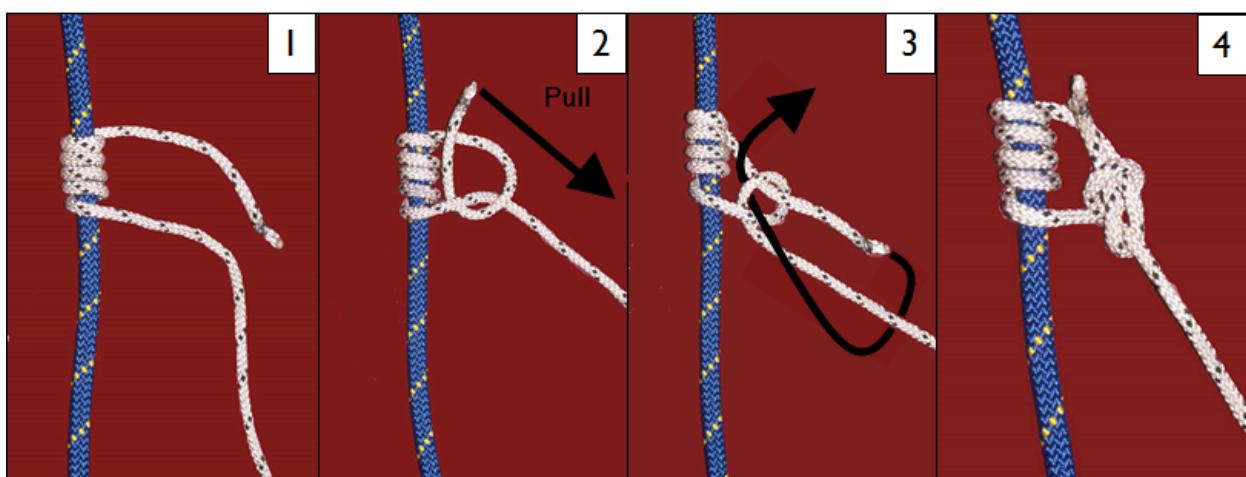


Figure 22. Helical knot. Should be finished with an overhand or Yosemite backoff

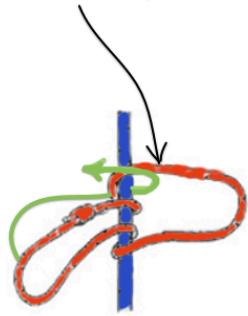
Never apply any downward pressure on the top coils of a loaded helical knot. This may cause it to slip. If it slips far enough to press down on the top of another knot, disaster may result.

Slide a helical knot up the main line by pushing it up from the bottom, not by gripping the knot. Tie the top knot first and remove it last. That way you will not end up hanging by your heels if you slip. It is best to tie this knot with a minimum of slack. It will stretch when loaded.

Prusik

The prusik knot is a friction knot similar to the helical. Once set, the prusik knot must be loosened before it will move freely. It is useful for attaching rope pads and as a safety in haul systems, and you can climb with it (but we have helicals, so why would you?)

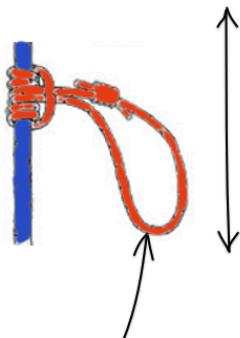
prusik cord must be no more than half
the diameter of the climbing rope



double fisherman's knot

coil prusik cord through itself 3 times

hitch slides up and down rope but locks
when weighted in either direction



loop can bear your weight

diagram from fossilfoolsnz.wordpress.com

Figure 23. Prusik knot.

Münter Hitch

The Münter hitch (or Italian hitch) is a friction hitch formed with a rope and locking carabiner. It can be used to belay single-person sized loads and can serve as an emergency rappel method, as well as to provide extra friction to the rope feeding into a rappel device (remember the braking line should not run over the carabiner gate) or as part of a load releasing hitch. It is very popular with rescue nuts. There is no “back off” for a Munter hitch, but the Mule Knot is used to lock it off.

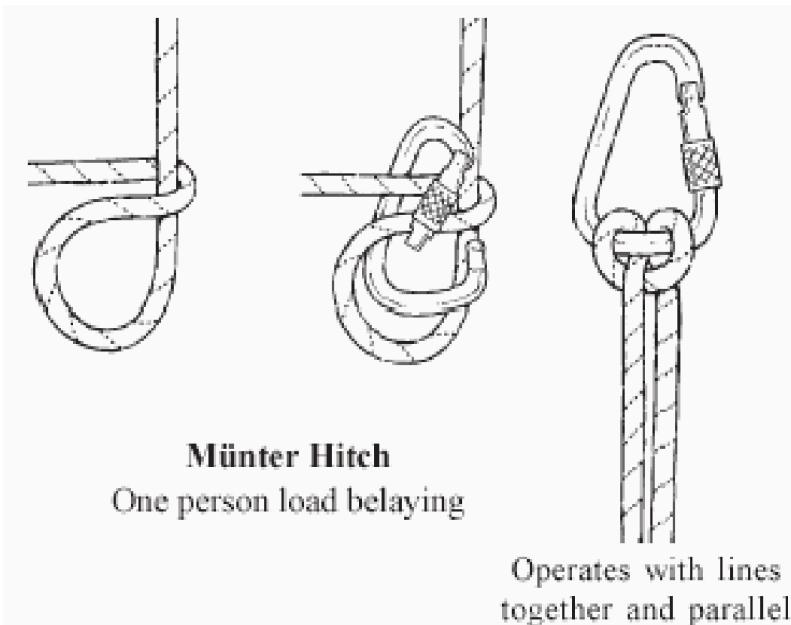


Figure 24. Munter hitch.

The Münter hitch provides good friction in a belay no matter the angle between the ropes and carabiner. (Some belay methods using devices like a figure-8 are quite sensitive to the angle of the ropes.) When used as a rappel device, it kinks the rope badly.

Tips:

- The Münter hitch will automatically reverse directions depending on if you are letting out or taking up rope. You should set the knot in the direction you are going to use it to avoid several inches of slack when the knot reverses.
- Consider carefully the rope and carabiner you use for this. You might be a Super Muscle Mega Man but you will still be unhappy feeding Deighan Rope through a münter in a tiny carabiner.

Constitution of the VPI Cave Club

Student Grotto of the National Speleological Society

Article I: Name

The name of this organization shall be the VPI Cave Club, Student Grotto of the National Speleological Society (VPI is an acronym for Virginia Polytechnic Institute).

Article II: Purpose

The purpose of this club shall be to promote interest in, and to advance the science of speleology; to promote conservation of caves and safety in their exploration; and to encourage fellowship among those interested in caving.

Article III: Membership

Section 1:

There shall be three classes of dues paying members: full, associate, and prospective. There shall be two qualifiers, inactive and life, as described in the By-Laws.

- a. Full membership shall be restricted to students, faculty, or staff of VPI&SU who have completed membership requirements as stated in the By-Laws. Full members shall have access to club records and files and may use club equipment.
- b.
 - i. Associate membership shall be reserved for those who have completed requirements for full membership but are not students, faculty or staff of VPI&SU. Associate members have all privileges of full membership except for the holding of an elected office and voting.
 - ii. Faculty or staff who are full members may, for any semester for which dues have been paid, choose associate membership. Full membership may be reinstated upon written notification of the club treasurer during the first two weeks of any subsequent semester.
 - iii. Students who are full members and who anticipate being absent from campus for a semester may choose associate membership for that semester.
- c. Any individual may be invited verbally by the president and vice president to become a prospective member upon recommendation of a full or associate member. The prospective member must be willing to uphold the purposes and policies of the club. A prospective member may attend and address meetings, but may not vote or hold elected office.

Section 2: Honorary members may be recognized at the discretion of the club for their outstanding achievements or contributions to the club or the interests of the club. Honorary membership is a ceremonial title and holds no bearing on actual membership status.

Section 3: Dues shall be paid in a timely manner in an amount as stated in the By-Laws.

Section 4: Any prospective, associate, or full member may face disciplinary action, including possible loss of membership privileges, as defined in the By-Laws.

Article IV: Officers

Section 1: The elected officers of this club shall be: president, vice president, secretary, and treasurer. Election procedures are defined in the By-Laws.

Section 2: All elected officers must be full or associate members at the time of the election and must be enrolled as full-time students at VPI&SU throughout the duration of their term. If an officer is not an NSS member, membership must be applied for within one month of the election.

Article V: Committees

Section 1: Standing committees shall be the Equipment Committee, Safety and Techniques Committee, Publicity Committee, Project and Program Committee, Conservation Committee, Supplies Committee, and Executive Committee.

Section 2: Special and ad hoc committees may be established by the president or by action of the club by simple majority vote.

Article VI: Amendments

Section 1: Amendments to this Constitution may be submitted by motion of any full member and then tabled after passing with a simple majority of votes from full membership.

Section 2: An amendment must be voted on no later than three meetings subsequent to its proposal, and the full and associate members of the club must be specifically notified of the date of the vote and the nature of the amendment in writing.

Section 3: A 3/4 majority vote of the full membership shall be required for the adoption of any amendment.

Article VII: By-Laws

Section 1: The club shall establish a set of By-Laws for the purpose of amplifying and explaining in detail certain sections of the Constitution.

Section 2: The By-Laws may be amended as follows:

- a. A motion to amend the By-Laws may be introduced by any full or associate member.
- b. If the motion is "seconded" it is automatically tabled.
- c. The secretary must notify the members of the amendment in writing.
- d. Final action shall be taken at the next meeting by a 2/3 vote of the full membership.

By-Laws

Safety Code

Section 1: General Safety

- a. Never cave alone. It is recommended that at least three people be on any caving trip: at least one full or associate member on horizontal trips and at least two full or associate members on vertical trips.
- b. Everyone participating in a trip should be physically and mentally capable of caving on that type of trip. Mind altering substances will not be used immediately prior to or during a cave trip.
- c. No one should exert themselves or be forced to exert themselves beyond their limit of endurance.
- d. If all lights fail, wait in place.
- e. Avoid jumping.
- f. All equipment should be in working order and pass inspection before entering the cave.

Section 2: Equipment

- a. General equipment per person: Appropriate type and quantity of equipment shall be taken on all caving trips.
 - i. Hard hats with suspension, chin-straps, and a mounted light source are mandatory while caving.
 - ii. At least three (3) sources of light, each providing sufficient light to exit the cave under reasonable circumstances.
 - iii. Supplies for light sources.
 - iv. Heat source.
 - v. Trash bag or space blanket.
 - vi. Energy ration (candy bar, etc.).
 - vii. Gloves, heavy boots or shoes, heavy clothing, or cave specific clothing are advisable.

Section 3: Procedure

- a. Always inform someone of the whereabouts of the caving trip, the expected time of return and appropriate phone numbers.
- b. Observe surroundings: respect landowners' wishes and be considerate of their property.
- c. If possible, consult someone who is familiar with the cave.
- d. All rigging is to be checked by a full or associate member. Ropes should be protected from fraying. All group members should be satisfied with rigging before it is used.
- e. Never leave a prospective member or other inexperienced caver alone.
- f. A belay should be used on every person on a ladder. No belay shall be used when ascending a rope. Prospective members or other inexperienced cavers must accept a belay when requested to by a full or associate member. Anyone desiring a belay shall have one. The first person to descend a rope shall ensure that those following have a belay. The order of ascent and descent shall be determined by a full or associate member on the trip.
- g. An appropriate loop knot should be tied on the lower end of any rope used for rappelling.

Membership

Section 1: Qualifiers

- a. The qualifier "inactive" applied to any of the membership categories shall denote that said individual has not paid current dues and therefore retains only the privilege of

attending and addressing regular meetings. Payment of dues shall result in automatic reinstatement of the membership previously held and all privileges thereof.

- b. The qualifier "life" shall be applied to any full, associate, or prospective member of the VPI Cave Club upon receipt of life membership dues. Life members shall have any membership privileges for which they qualify, but are exempt from yearly dues.

Section 2: Training Program

The VPI Cave Club training program shall develop educated cavers consistent with Article II of the Constitution. The training program shall develop the basic skills to be safe and self-reliant underground. To be qualified as a full or associate member of the club, a prospective member must:

- a. Read and understand the Constitution and By-Laws of the Cave Club.
- b. Remain a prospective member for at least 10 weeks during which time he/she spends 40 hours underground on at least 6 trips on which at least one full or associate member is present.
- c. Demonstrate elementary climbing skills in a cave.
- d. Demonstrate a working knowledge of belaying methods.
- e. Be able to tie a seat harness with webbing.
- f. Demonstrate a working knowledge of change-over from descending to ascending and ascending to descending.
- g. Demonstrate a working knowledge of rappelling and climbing rope in a cave, and demonstrate a working knowledge of climbing on knots.
- h. Demonstrate how to rig and pad a rope correctly.
- i. Know how to tie and explain the uses of: bowline, mountaineering bowline (double bowline), bowline on a bight, bowline on a coil, figure 8, figure 8 on a bight, double figure 8, alpine butterfly, square knot, overhand knot, Münter hitch, water knot, helical, prusik, double fisherman's bend.
- j. Complete satisfactorily a comprehensive general information quiz.
- k. Be endorsed by a full or associate member in good standing.
- l. Submit to the editor a suitable article for publication in The Tech Troglodyte allowing reasonable time for review and revision.
- m. Be approved by a 2/3 majority vote of the full membership.

Disciplinary Action

Section 1:

Any prospective, associate, or full member who has allegedly committed an infraction of the VPI Cave Club Constitution, or By-Laws, or upon recommendation of the Safety and Techniques Committee, may face possible disciplinary action in the form of a reprimand, suspension, or expulsion, as defined below.

Section 2:

Levels of disciplinary action:

1. Reprimand: A reprimand shall be the lowest level of disciplinary action and shall be noted in the minutes.
2. Suspension: A suspension is the intermediate level of disciplinary action. A suspension shall be reduction of an associate or full member's rights to those equivalent to

prospective member status. A prospective member cannot complete any membership requirements while on suspension. The time period for a suspension shall be fifteen (15) weeks after which time the previous membership status is reinstated.

3. Expulsion: An expulsion is the highest and most severe level of disciplinary action. An expelled person is ejected from the club and all club functions and current dues are returned. Previously completed membership requirements are null and void. A person expelled from the club can only rejoin the club by being allowed to restart the training program by 2/3 majority vote by secret ballot.

Procedure:

1. A member of any class may bring a complaint for disciplinary action to the president.
2. The president shall convene the Executive Committee to evaluate the complaint.
3. Upon review, the Executive Committee shall bring the complaint to the club, within two regular meetings of the receipt of the complaint, with a recommendation for action.
4. The Executive Committee's recommendation shall constitute a motion.
5. If the motion is to dismiss the complaint, upon a "second" it may be voted on at the current meeting and requires 2/3 majority vote to pass.
6. If the motion is for a level of disciplinary action, as defined above, upon a "second" the motion will be tabled until the next regular meeting.
7. The accused shall be given notice of the tabled motion at least three (3) days in advance of the meeting in which the final vote is to be taken and shall be given ample opportunity to present a defense before the club.
8. At the meeting following the tabled motion a discussion on the accused's infractions will occur. At the close of the discussion a secret ballot shall be taken to determine whether or not action will be taken on the disciplinary measure.
9. A vote to take action must be passed by 2/3 majority of full members.

Officers

Section 1:

The officers of the club shall be elected by ballot from candidates nominated from the floor. The order of election shall be president, vice president, treasurer and secretary. To be nominated, a member must meet the qualifications of Article IV, Section 2 of the Constitution. A separate ballot shall be voted for each office. A simple majority of the votes cast shall be necessary for election. In case there is no majority, the candidate with the lowest number of votes shall be dropped and a re-vote for the remaining candidates shall be taken. The election shall be held at the tenth regular meeting of the spring semester. A 2/3 vote of full members shall be necessary to invalidate the election.

Section 2:

If the president and vice president are absent during the summer, the president shall appoint a president pro tem from among the full members available.

Section 3:

In event of the resignation or release from office of an officer, a special election shall be held at the next regular meeting to elect a member to the office for the completion of the term of office.

Section 4:

The duties of the president shall be:

- a. To preside at all meetings and call special meetings.
- b. To act as an ex-officio member of all committees.
- c. To represent the club officially in all matters except those which require the cooperation of the treasurer.
- d. To make appointments to special committees unless provision is made otherwise in the resolution establishing the committee with the approval of the majority of the committee members.
- e. To make appointments to standing committees and to appoint committee chairmen and to remove appointees.
- f. To make arrangements for the meeting room.
- g. To appoint an editor for club publications.
- h. To appoint a club parliamentarian.

Section 5:

The duties of the vice president shall be:

- a. To assume the president's duties during the president's absence.
- b. To assist the president as the president shall require.
- c. To countersign as authorizing officer vouchers for the expenditures that have been authorized by the club.
- d. To be an active participant in the safety committee as director of the new member training program.

Section 6:

The duties of the treasurer shall be:

- a. To have charge of the finances of the club.
- b. To keep an accurate record of the finances of the club, including balancing records weekly.
- c. To collect any and all dues and fees which the club shall authorize.
- d. To give a complete report on the financial status of the club at every regular meeting.
- e. To keep a list of the club members and their status, and to make this available to all members, faculty advisors, and at all club meetings.
- f. To make disbursements when authorized by motions passed by the club and only when so authorized.
- g. To comply with regulations of the VPI Office of Student Affairs pertaining to finances.
- h. To allow no transactions to occur without proper receipts.

Section 7:

The duties of the secretary shall be:

- a. To keep a record of all club proceedings of all meetings of the club and place a copy in the club files, within two academic weeks.
- b. To keep a phone list of the members of the club and to make this available to all members and faculty advisors.
- c. To conduct correspondence for the club as directed by the president.
- d. To notify the NSS of changes in officers and other pertinent information.
- e. To notify faculty advisors of proposed amendments to the Constitution or the By-Laws.
- f. To make note of proxy votes.

- g. To provide timely notification to club members of issues as specified by the Constitution or By-Laws.

Section 8:

- a. An officer may be impeached for specific and willful infractions of the Constitution, the By-Laws, or the policies of the club.
- b. Process:
 - i. A motion to impeach stating specific infractions shall be made by a member, committee, or other officer.
 - ii. The motion shall be automatically tabled upon a "second" to the next regular meeting.
 - iii. The officer shall be given notice of the motion at least three (3) days in advance of the meeting in which the vote is to be taken, and be given ample opportunity to present a defense before the club.
 - iv. Final action shall be by secret written ballot and will require a 2/3 majority vote of the full membership for removal from office.

Section 9:

Officers who are full members at the time of election shall assume their duties at the close of elections. Officers who are associate members at the time of election shall assume their duties at the first meeting of the fall semester. All officers shall serve until the elections of the following spring. If any office is left vacant by the election of an associate member, the president shall appoint an officer pro tem from among the full members available.

Advisor

If desired, any person may be elected as an advisor to the club by a simple majority of votes from full membership.

Meeting and Quorum

Section 1:

- a. To constitute a meeting for the transaction of business, a quorum shall constitute one half (1/2) of the full membership either in person or represented by proxy.
- b. The secretary shall be notified of each proxy before a vote. Blanket or continuous proxies shall not be held.
- c. Meetings shall be held Fridays at 7:00P.M. during the academic year.
- d. Meetings shall comply with Robert's Rules of Order.

Dues

Dues for prospective members, full members and associate members shall be ten dollars (\$10.00) per semester. Life membership shall be one hundred and thirty dollars (\$130.00), payable in installments, to be paid in full within one year of the first installment.

Committees

Section 1:

It shall be the duty of the Safety and Techniques Committee to:

- a. Supervise the new member training program.
- b. Encourage safe caving practices and recommend disciplinary action where necessary.

- c. Present periodic programs on current safety practices.
- d. Submit a written report to the president upon request.
- e. Oversee maintenance and inventory of club rescue gear.
- f. The Safety and Techniques Committee shall consist of the safety chairman, the president, the vice president, former safety chairmen, former presidents, and vice presidents, and anyone that the president or safety chairman deems necessary.

Section 2:

It shall be the duty of the Publicity Committee to:

- a. Communicate with incoming freshmen and the student body on the availability and activities of the club.
- b. Submit articles to the school newspaper, etc., on the club's activities.
- c. Publicize any activities which may be open to other groups.
- d. Submit to the files such material that may be printed by or about the club.
- e. Submit a written report to the president upon request.

Section 3:

It shall be the duty of the Conservation Committee to:

- a. The chairman of the Conservation Committee shall be a member of the National Conservation Committee of the NSS.
- b. Encourage projects and better practices in cave conservation.
- c. Instruct new members on the principles of cave conservation.
- d. To bring to the attention of the club any violation of the club's policy of conservation.
- e. To scrutinize the mailbag for any material related to cave conservation.
- f. Submit a written report to the president upon request.

Section 4:

It shall be the duty of the Project and Program Committee to:

- a. Plan and coordinate club projects, special activities, and social functions.
- b. Plan and make arrangements for programs to be presented periodically at the regular meetings.
- c. Submit a written report to the president upon request.

Section 5:

It shall be the duty of the Supplies Committee to:

- a. Buy equipment for the club store for sale to the club members and prospective members out of a special revolving fund established for this purpose.
- b. Make equipment available for sale at all meetings to all dues paying individuals.
- c. The fund shall be increased by semesterly appropriations until such time that it becomes self-sustaining. The fund shall be allowed to draw upon the club treasury in the form of loans when additional funds become necessary.
- d. Keep an accurate and up to date record of the finances of the club store, including giving a financial status report within one week of a request from the treasurer, and submitting a complete report of the store's activities to the treasurer at the end of the fall and spring semesters.

Section 6:

It shall be the duty of the Executive Committee to:

- a. Preside over disciplinary proceedings.

- b. Act for the club in emergency situations when it is not feasible for the club to meet.
- c. The Executive Committee shall consist of the officers, the head of the Safety and Techniques Committee and other person(s) appointed by the president.

Club Files

Section 1: Maintenance:

The president shall appoint a person to keep and maintain the files.

Section 2: Substance:

The club files shall consist of cave maps, trip reports, meeting minutes, cave related publications, membership related material, and historical material.

Section 3:

The file chairman shall submit a written report to the president upon request.

Club Trips

Club trips are caving trips which are recognized by the VPI Cave Club and which follow the spirit and intent of its Constitution and By-Laws. A caving trip is recognized if it has at least one full or associate member on it and it is properly signed out. (See By-Laws, Safety Code, Section 3.A for definition of a properly signed out trip.)

Club Savings

Section 1: The club shall establish a savings fund to be placed in an interest drawing savings account.

Section 2:

The savings fund shall be drawn upon only for investments of long range importance to the club.

Section 3:

The savings fund shall be increased by semesterly appropriations when possible.

Club Publications

Section 1:

The grotto shall publish a periodic journal to advertise grotto projects, trips, and other activities. It shall further contain material of scientific and technical interest to the caving world.

Section 2:

The title of this publication shall be: The Tech Troglodyte.

Section 3:

The format and journalistic style shall be set by the editor.

Section 4:

The circulation of this publication shall be to all members and prospective members who have paid current dues. In addition, the NSS library and all other grottoes which offer their publication in exchange shall receive this publication. An exchange editor will be appointed by the president for these duties, and he/she will cooperate with the mailbag person to keep an updated exchange file.

Glossary

General Caving Terms

- **Bore Hole** - Wide open walking passage. See “Pennsylvania Borehole.”
- **Breakdown** - Rocks that have fallen from the ceiling, often into a pile. Don’t worry, that probably happened years and years ago.
- **Chimneying** - Described in the elementary climbing section. This will make sense once you’ve been to Links.
- “**Grim**” - This passage sucks. Good thing we’re doing it anyway.
- **Phreatic** - Cave passage formed below the water table. Usually roundish.
- **Ridge Walking** - Walking around looking for signs of new cave entrances.
- **Speleothem** - A rock formation made from limestone or other calcite minerals deposited by water.
 - **Column** - Self explanatory. What happens when stalagmites and stalactites meet.
 - **Coralloid** - Coral-shaped. Small nodules of rock that form on the walls, floors, and ceilings in caves.
 - **Flowers** - Most commonly gypsum, formed by water forced through pores in rock by capillary action. Very closely resemble their namesake. May be difficult to get to and from.
 - **Flowstone** - Large formations by flowing water. Common on and around slopes.
 - **Helictite** - Small, crooked, irregular formations created similarly to flowers.
 - **Soda Straws** - Baby stalactites. Thin, hollow, translucent formations.
 - **Stalagmite** - The ones on the floor. You “mite” trip on them.
 - **Stalactite** - The ones on the ceiling. You “mite” hit your head on them. Wait...
 - **Rimstone / Gour** - Formed by minerals deposited around the edge of a pond or puddle: often resembling a dam.
- **Stream Crawl** - You’re going to be on your stomach and you’re going to get wet.
- **Sump** - a passage in a **cave** that is submerged under water. Notify the Safety Chair if found.
- **Surveying** - The process of collecting cave passage data. Hopefully used to someday produce a map.
- “**TT**”/Too Tight - Survey designation that means it’s for Tommy.
- **Vadose** - formed above the flow of water.

Knots Terms

- **Bend** - A knot used to fasten one rope to another.
- **Bight** - The rope is doubled back but does not cross itself.
- **Hitch** - A knot used to fasten a rope some object or another rope. The rope or object you are hitching to is not part of the knot; a hitch will fall apart if the rope or object is removed.
- **Knot / True Knot** - Formed when the rope is tied to itself. Fixed loops, mid-line loops, and stopper knots are true knots.
- **Loop** - Formed when the rope is doubled back and crosses itself.

- **Main Line / Standing Line** - the part of the rope between the anchor and load. It is the part you rappel or climb.
- **Running End / Free End** - the end of the rope that is not attached to the anchor. It is the part of the rope you are not supposed to rappel off.
- **Working End** - refers to the section of rope you're actively manipulating ex) The end that you're using to tie the knot when you tie a rig.

Vertical Caving and Rope Terms

- **Ascender** - A mechanical device that grasps the rope as it is pushed up. Used for climbing rope.
- **Belay** - To fix (a running rope) around a cleat, pin, rock, or other object, to secure it; a spike of rock or other hard material used for belaying.
- **Belaying** - A variety of techniques used to exert tension on a climbing rope so that a falling climber does not fall very far or very quickly.
- **Croll** - A chest ascender made by Petzl. Also a general term for chest ascenders.
- **Descender** - Device used to safely go down a rope.
 - **Figure Eight** - A device used for twisting and blackening rope. Also rappelling.
 - **Rack** - Those things you check out during pong games at speleo. Or, less commonly, a device used for rappelling.

Acronyms

- **ALB** - Amazing Levitating Boulder. A rock held up in a crevice by a few minuscule points of contact with the walls.
- **BATS** - Battlefield Area Troglodyte Society. An NSS-chartered grotto based out of Fredericksburg.
- **BCRG** - Blacksburg Cave Rescue Group. Part of the Blacksburg Volunteer Rescue Squad (BVRS). Simultaneously an important organization for which we are very grateful, and where you go just before you start armchair caving.
- **BFR** - Big Fuckin' Rock. Alternatively, should you be leading a Boy Scout trip, Big Friendly Rock. An extremely large chunk of breakdown.
- **BNC** - Big Name Caver. An (in)famous caver.
- **BOG** - Board of Governors. The head of the National Speleological Society, consisting of twelve Directors elected by NSS members and an appointed five person "Executive Committee." In charge of managing the various committees of the NSS.
- **BRG** - Blue Ridge Grotto. Another NSS grotto, based out of Roanoke.
- **CHUD** - Cannibalistic Humanoid Underground Dweller. From the 1984 cult classic of the same name; a cave adapted human which preys on its feeble, weak, above-ground dwelling cousins. Common throughout the New York area.
- **CE** - *Conformité Européene*. A stamp or marking on certain products sold in the EU indicating that the item meets standards for consistency and safety. Explosives, measuring tools, and helmets and other safety gear are some (un)common caving-related items covered by regulations.
- **CE** - *Chinese Export*. Hmm....

- **COG** - Congress of Grottos. From the NSS website, “The Congress of Grottos is an advisory body that meets yearly at the NSS Convention where representatives of NSS Internal Organizations (IOs) discuss and vote on issues of concern to the IOs and NSS members. The COG sends a report of their meeting to the NSS Board of Governors, who must respond to any issues or questions raised by the COG.”
- **DIP** - Drunk In Public. The charge of having consumed enough sweet, sweet alcohol to visibly affect behavior in a public place. Alternatively, swearing. A class 4 misdemeanor.
- **ETA** - Estimated Time of Arrival.
- **ETD** - Estimated Time of Departure.
- **FYW** - Filthy Young Women. A small, semi-regular annual trip held during Spring Break in Natural Tunnel State Park by VPI cavers to train new prospective and full members in cave survey techniques. Successor to Dirty Old Men.
- **GORP** - Good Ol’ Raisins and Peanuts. Cheap, calorie dense, and easy to pack.
- **IMO** - Inner Mountain Outfitters. Online retailer selling a variety of caving and climbing related gear.
- **MSA** - Mine Safety Appliances co. A manufacturer of personal safety gear related to miners.
- **NCRC** - National Cave Rescue Commission. The National Cave Rescue Commission is an NSS internal organisation responsible for training cavers in cave rescue operations, and managing resources required for cave rescues.
- **NRVG** - New River Valley Grotto. Grotto based out of Radford, VA.
- **NSS** - National Speleological Society. “For over 70 years, the National Speleological Society has promoted safe and responsible caving practices, effective cave and karst management, speleology, and conservation.” The NSS is the governing body of which all grottos are a part and the largest caving organization in the world. Their motto is “Take Nothing but Pictures, Leave Nothing but Footprints, Kill Nothing but Time.”
- **OTR** - Old-Timer’s Reunion. A once a year event where all cavers, not just old farts, gather to cave and party.
- **PBR** - Pabst Blue Ribbon. The elixir, so named for a state-fair prize won in 1893 (allegedly). This 4.72% American-style lager forms the backbone of any reputable grotto.
- **PMI** - Pigeon Mountain Industries. Rope and vertical gear manufacturer.
- **RASS** - Richmond Area Speleological Society. NSS grotto based out of Richmond, VA.
- **SCCi** - Southeastern Cave Conservancy, incorporated. A non-profit corporation dedicated to conserving and protecting caves and endangered species throughout the southeast.
- **SIVTAC** - Some Individual Virginia Tech-Associated Cavers. A collection of people who, despite any possible connections, are not representing the VPI Cave Club or Virginia Tech in general during whatever they may or may not be up to.
- **TAG** - Tennessee-Alabama-Georgia. The tristate area is known for a number of large, deep pits (and less well-known long horizontal caves). Also known for the TAG Fall Cave In event, a sort of Burning Man for cavers, held annually in Georgia.
- **UIAA** - *union Internationale des Associations d’Alpinisme / International Climbing and Mountaineering Federation*. Yet another safety stamp.

- **UL** - Underwriters Laboratories. A stamp or mark indicating that a product meets the safety standards set and reviewed by Underwriters Laboratories, an American consulting company that performs safety testing. Similar to the CE stamp on European goods.
- **VAR** - Virginia Region (of the NSS). Refers to grottos in Virginia and surrounding states. Also refers to Spring VAR and Fall VAR, two social events held by VAR grottos.
- **VPI** - Virginia Polytechnic Institute (Caving Club) - You and us.
- **VSS** - Virginia Speleological Survey. An NSS organisation responsible for conservation of caves and endangered species in Virginia caves.
- **WVACS** - West Virginia Association for Cave Studies. Large grotto based in West Virginia. Maintains several bunkhouses for use by cavers.
- **WVASS** - West Virginia Speleological Survey. “A voluntary association of cavers and caving groups, each of which pursues its own interests...there is cooperation because we have a common desire: to gather and maintain information about West Virginia caves and karst.”
- **YTR** - Young-Timer’s Reunion. A recently revived, once a year event where all cavers, not just young cavers, come together to cave and party.

Caver Slang & Other Terms You Will Encounter

- **Adequate** - You’re a trainee. This is the highest endorsement you’ll ever get until you get your membership. Try really hard to not be inadequate.
- **A.I. Cartwright** - Our mascot! Lives in Clover Hollow; once you’re vertically trained, you can pay him a visit. Also the name of our highest and most esteemed award.
- **Air Rappel** - A high-risk, high-reward method of rappelling that involves forgoing descenders, voluntarily or otherwise. You might *just* beat Deighan to the bottom.
- **Armchair Caver** - Caver who spends more time and energy discussing and arguing caving than caving.
- **Backsight** - Measurement taken from a new point to a previously established point in a cave survey. Take ‘em, don’t mess ‘em up.
- **Banquet** - Annual semi-formal event hosted by VPI to celebrate and recognize landowners and outstanding VPI-ers.
- **BAT** - An award you could get if you’re very, very adequate.
- **Bat Ranch** - Caver Disneyland. A magical place of burning pianos, light lager, and full frontal nudity.
- **Bear Spiders** - Probably not actually real.
- **Biner** - Carabiner.
- **Biner Pop** - Accidentally opening the gate of your biner while in use. Don’t.
- **Bomb-Proof** - Overengineered and/or operating with many redundant systems. Alternatively, a very sturdy rock or other rigging point.
- **Booty** - Unmapped or, more often, untravelled cave passage; virgin passage.
- **Brain Bucket** - Helmet. Also an award.
- **Capping** - The process of drilling holes into rock, inserting straws tamped full of pistol powder, and detonating them. Used to open up too-narrow passage.
- **Cave Booger** - Spend six hours in dusty air and you’ll find dirt everywhere.
- **Cave Tan** - A fine layer of dirt and/or bruises.

- **Club Files** - The collected publications, correspondences, maps, and miscellaneous documents of the VPI Cave Club. Nobody has ever actually seen the club files in person, but we're sure they exist.
- **Cosmic Energy Vortex** - See 'Bat Ranch'.
- **Cratering** - See 'Air Rappel'.
- **Death March** - A very long and tiring caving trip. Alternatively, a cave that requires a very long and tiring hike to get to (everything in TAG).
- **Dead Bottom** - A small, open-air pit found in karst regions that doesn't contain any other passage. Watch your step!
- **Disto** - A laser survey device used to measure the distance and angle between two points.
- **Dump** - Spent carbide left in caves.
- **Eurotrash** - Bobbins, rebelays, alpine technique, and everything else Moneyhun likes.
- **Float** - Annual summer party hosted by SIVTAC on a giant innertube and plywood raft in the New River.
- **Foresight** - A measurement taken towards a newly established point in a cave survey.
- **Inclo** - Inclinometer. A device used to measure the vertical angle between two points.
- **Instant Cave** - See 'Capping'.
- **Karst** - Hilly land characterized by many underground systems and boulders formed by dissolution of limestone and other calcium-based minerals.
- **Kegged** - Getting "kegged" happens when you miss your signout time but *didn't* require a rescue: all members on the trip share the cost of a keg for the next party. Also happens when you somehow forget how to fill out your signout correctly.
- **Keyboard Caver** - See 'Armchair Caver'.
- **Lipping** - Hugging the minimal airspace of a flooded passage with your face.
- **Nerd Caver** - An overeager caver who is unprepared for even beginner cave trips.
- **Nuisance Drop** - A short rappel that can't/shouldn't be free-climbed, requiring much time to be spent rigging and getting on & off rope.
- **Old Fart** - Old caver. Do they reminisce about carbide caving? Do they miss meetings to hang out at the Pub? Were your favorite caves still unformed when they started caving? Old fart.
- **Popcorn** - Coralloides. Will motivate you to buy kneepads.
- **Picnic** - Annual camp out and bonfire held in April on the Penley property.
- **Pretties** - Speleothems, specifically, the small, clean, white ones.
- **Quarry** - One particular small, abandoned limestone quarry near the Bat Ranch. Great for vertical training.
- **RASShole** - A RASS member.
- **Robert's Rules Of Order** - Ask Ed.
- **"Rock!"** - Do not look up.
- **Rock Solvent** - See 'Capping'.
- **Sign Out** - Don't miss it.
- **Scoop** - To cave through virgin passage without surveying it. Less specifically, caving on a survey trip without surveying the passage.
- **Sherp** - Stuck hauling gear or equipment for another caver or for the expedition.

- **Smart End** - The end of a tape measure taken by the third member of a survey team (the “point”) from one point to the next point down the passage. The **Dumb End** is left with the caver using the instruments so that he or she can relay data to the sketcher.
- **Speleopolitican** - A caver who is more interested in the management and goings-on of grottos, the NSS, and their fellow cavers than in actually enjoying caving. Similar to but slightly different from an armchair caver.
- **Speleoseminar** - A temperate and abstinate gathering held every night Friday after meeting, a discussion on the finer points of caving technique and etiquette.
- **Spelunker** - See ‘Nerd Caver’.
- **Spelunk** - The noise made by a nerd caver after an air rappel.
- **Sten** - StenLight S7. A high end LED caving lamp.
- **Stokes** - A plastic stretcher used to immobilize and move an injured caver out of a cave.
- **Troglodyte** - A primitive, cave-dwelling humanoid. Alternatively, a caving publication.
- **Type-2 Fun** - It sucks, but I’m doing it this weekend and next weekend and the next.
- **Wellies** - Wellington boots. Calf-high boots that keep the water in.
- **White Nose/WNS** - A fungal infection found in bats, originating in Europe. Devastating to the regional bat population.
- **Work Weekend** - One or more days spent doing odd jobs for landowners in exchange for letting us host social events on their property.
- **Wunderwear** - A custom-made caving suit made by B&C Wunderwear.
- **Zebra** - Short for “zebralight.”

Membership Sign-Off Sheet

Name: _____

The goal of the training process is for trainees to get their memberships around the time that they start being an asset on cave trips. Ask questions! Give advice! And always have a good time.

Read and understand *The Constitution and By-Laws of The VPI Cave Club.*

[Signature]	Date	Comments]
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Remain a prospective member for at least

- 10 weeks during which time you spend
- 40 hours underground on at least
- 6 trips on which at least one full or associate member is present.

[Signature]	Date	Comments]
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Demonstrate elementary climbing skills in a cave.

[Signature]	Date	Comments]
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Demonstrate a working knowledge of belaying methods.

Top belay for cable ladder.

[Signature]	Date	Comments]
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Bottom belay for rappelling or climbing.

[Signature]	Date	Comments]
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Be able to tie a seat harness with webbing.

[Signature]	Date	Comments]
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Demonstrate a working knowledge of change-over from descending to ascending and ascending to descending (with your primary vertical system).

[Signature]	Date	Comments]
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Demonstrate a working knowledge of rappelling and climbing rope in a cave, and demonstrate a working knowledge of climbing on knots.

Rappelling

[Signature]	Date	Comments]
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Climbing

[Signature]	Date	Comments]
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Knots

[Signature]	Date	Comments]
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Demonstrate how to rig and pad a rope correctly.

- Friction wrap?
- Fixed loop?
- Bolts?
- Webbing wrap?

[Signature]	Date	Comments]
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Be able to tie and explain the appropriate uses of the following knots:

- bowline
- figure 8
- overhand knot

- | | | |
|---|--|--|
| <input type="checkbox"/> mountaineering bowline | <input type="checkbox"/> figure 8 on a bight | <input type="checkbox"/> square knot |
| <input type="checkbox"/> bowline on a bight | <input type="checkbox"/> double figure 8 | <input type="checkbox"/> water knot |
| <input type="checkbox"/> bowline on a coil | <input type="checkbox"/> alpine butterfly | <input type="checkbox"/> helical |
| <input type="checkbox"/> prusik | <input type="checkbox"/> Münter hitch | <input type="checkbox"/> double fisherman's bend |

[Signature | Date | Comments]

Complete satisfactorily a comprehensive general information quiz.

[Signature | Date | Comments]

Be endorsed by a full or associate member in good standing.

[Signature | Date | Comments]

Submit to the editor a suitable article for publication in *The Tech Troglobdyte* allowing reasonable time for review and revision.

[Signature | Date | Comments]

Be approved by a 2/3 majority vote of the full membership.

[Signature | Date | Comments]

We hope the training program has provided you with most of the basic information you need to cave safely and responsibly. Your comments will help us improve it. Did you find errors in the Trainee Trog? Are there other things you think should be covered? Is there too much information on some subjects? Go talk to a member!

Comments: