Climbing Gear Selection Essentials

Introduction

This guide is a collection of information useful in the selection of traditional rock climbing gear. The content is largely compiled from the *Boy Scout of America* climbing & rappelling manual *Topping Out*, as well as various Internet web sites. Of specific value for illustrations was *REI's Learn & Share* section on climbing. A focus of this guide is to provide a basic understanding of issues behind the selection criteria of a variety of rock climbing devices and hardware.

What Is Traditional Climbing?

Traditional climbing, or "trad" climbing, as it's popularly known, is climbing as it was always done until fairly recently. In the "old days" of the 1980s, trad was simply known as climbing. It was only after sport climbing took off that a name was created to distinguish this style of climbing.

How is trad different from sport climbing?

- In the simplest terms, sport climbing focuses almost entirely on physical challenges, while trad climbing involves a mental game as well.
- Traditional climbing involves carrying and placing protection (chocks, camming devices and so on) rather than clipping into preplaced bolts.
- The traditional climber must practice route-finding, whereas a sport climber follows the bolts up a particular route.
- Traditional climbing requires technical knowledge of climbing anchors and skill in making them. Sport climbing requires little technical knowledge of equipment.
- Sport climbers think nothing of falling repeatedly while trying to figure out a tough move; trad climbers are careful not to fall on the anchors they place.
- Trad climbing is nearly always done outside on real rock where no preset bolts exist, rather than in a gym.

Certain topics have been tailored to address specific issues as they apply to basic rock climbing under the *Boy Scouts of America, Climb-on-Safely* program.

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The Climbing Harness

A harness links you to your climbing rope, so it's important to be an informed shopper. It should fit your body shape for comfort and safety, and be designed to meet the needs of your climbing style. Alpine, big wall and competition climbing as well as traditional climbing all have unique requirements that influence harness selection. Construction varies among these categories to meet your specific needs. Women's and children's harnesses, for example, have special fit characteristics.

Step #1: Consider Your Climbing Style

What kind(s) of climbing do you plan to do most often? This will help you decide what features are the most important.

- **Traditional or Multi-Purpose** -- These are also known as all-around, crag or sport harnesses. Ideal for beginners, they are designed to function well in a number of climbing applications such as top-roping[1], sport and gym climbing. Most have padded leg loops and waistbelts for maximum comfort when working a route or taking a fall. Detachable leg loops let you answer calls of nature without untying from the rope. Most models also feature convenient gear racking loops for easy access to hardware or chalk bag without the need for a shoulder sling. These harnesses typically feature a dedicated front loop so you can easily attach a belay/rappel device.

- **Alpine** -- Designed for long mountain trips, these harnesses typically feature minimal padding and features in order to save weight and bulk. Non-absorbent materials are used to withstand the rough weather often encountered in glacier and alpine climbing. Highly adjustable waistbelt and leg loops allow for clothing changes between pre-dawn chill and afternoon sunshine. Leg loops are usually detachable so you can take toilet breaks while staying tied into the rope at the waist.

- **Big Wall** -- These harnesses are used by climbers doing multi-pitch, multi-day climbs such as those in Yosemite Valley. They feature lots of padding on the waistbelt and leg loops to relieve pressure during hanging belays or aid climbing. Multiple gear loops allow handy on-harness gear racking and take some of the weight off your shoulder gear sling. They usually feature a full-strength haul loop in back for towing a rope or heavy gear bag.

- **Competition** -- These streamlined harnesses are the best choice for climbing competitions such as On Sight Difficulty or Speed Events. Their slim design and narrow webbing allow a full range of motion. They typically have little padding and few, if any, frills or extras.

Step # 2: Compare Types of Harnesses

- **Leg Loop/Waistbelt or Seat** -- This popular style of harness consists of a padded waist (or "swami") belt and a pair of leg loops joined in front with a belay loop. The waistbelt

[1] See footnotes on pp.29 for more detail.

buckles in front or off to the side, and the leg loops are typically held up in back with elastic straps. These straps are often detachable for ease of changing clothes or answering calls of nature. Leg loop size may be either fixed or adjustable. Some manufacturers sell swami belts and leg loops separately to offer a truly customized fit.

NOTE: For safety and comfort reasons, never attempt to climb in just the waistbelt or the leg loops by themselves.

- **Diaper** -- Diaper-style harnesses are normally constructed of flat webbing that wraps around your waist and legs. It consists of a buckled waistbelt with adjustable leg loops sewn to it. This design allows you to adjust the fit for varying thickness of clothing. Some diaper-harness leg loops can be released while the waistbelt remains tied to the rope, making clothing changes and calls of nature safer. These harnesses typically do not have a separate belay loop.

- **Full Body** -- Full-body harnesses are designed for children or adults with narrow waists and hips. The harness holds shoulders as well as legs, preventing you from slipping out should you rotate upside down during a fall. Since full-body harnesses have a higher tie-in point than seat harnesses, they reduce the chance of flipping over backward in the first place. Despite this, many climbers prefer separate seat and chest harnesses for their comfort and versatility.

- **Chest** -- Chest harnesses are typically worn only on climbs where you could likely turn upside-down. Falling into a crevasse during a glacier climb or rappelling with a heavy pack are examples of such situations. The chest harness is really a component part. It must be worn in conjunction with a seat harness. The resulting combination is the same as the full-body harness, but with the versatility of adding or removing the chest portion, as needed.

- **Women's Cut** -- Women have been using men's harnesses for years. For many women, they work just fine. However, not all bodies are created equal. Women-specific harnesses address two considerations:

    1. Women often have smaller waists and larger thighs than men. Many women need harnesses made with these proportions in mind.
    2. Women frequently have longer rises (the distance between crotch and waist) than men do. On harnesses designed for women, the leg loops are typically farther from the waistbelt to account for this difference.

  Some harnesses that take these factors into account are the Arc'Teryx Isis, Petzl Bonnie, Misty Mountain Finesse and the REI Women's Evolution. Some unisex harnesses are fully adjustable and work well for women. The Misty Mountain 3D harnesses feature adjustable waist and leg sizes plus adjustable rise lengths.

Step #3: Check for Fit

Finding a harness that fits you well is essential. Too tight, and it will restrict your movement and/or pinch. Too loose and it will slip, chafe and, in an inverted fall, maybe even let go of you. Just like clothing, different harness brands fit different body shapes better than others. Be sure to find one that works well for you.

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Whenever you test-fit a harness, make sure you're wearing the kinds of clothes you're likely to be wearing while climbing. If you plan on carrying a pack with you as you climb, have it handy as well so you can make sure it doesn't cause any discomfort when worn in conjunction with the harness.

The Waistbelt -- Your harness waistbelt should be snug, but not uncomfortably so. It should ride just above your hipbones, but it should not interfere with your breathing. You should not be able to pull the harness down over your hips, no matter how hard you try. Children and narrow hipped adults -- if you can't get a harness to stay above your hipbones, use a full-body harness until your body shape works with a waistbelt-style harness. Be sure that there is at least 3 inches of webbing extending out of the waistbelt buckle once it has been properly secured and doubled back.

Leg Loops -- Your harness leg loops should also be snug, but not uncomfortable. If they are an adjustable design, their webbing straps should be long enough for you to double them back through their buckles with at least 2 inches left over.

Be especially careful when fitting a seat harness. If you choose one that's too small, it will squeeze your hips and legs, reducing mobility. If you choose one that's too large, the harness may slide up onto your lower ribs, compressing your diaphragm and leaving you gasping for air. You should have between 1 and 3 inches of clearance between the tie-in loops at your waist.

Buckling up and tying-in

Most harnesses use full-strength buckles to join the waistbelt. Read the manufacturer's instructions carefully and learn how to use your harness and the buckle correctly. If your harness and buckle are not secured properly, you risk injury and possibly even death.

Most harness buckles must be buckled a specific way to be secure. Be sure you follow the recommended procedure every time. ALWAYS double back all webbing straps through your harness buckles. Under the impact force of a fall, webbing straps that are not doubled-back can pull through buckles, causing you to fall out of the harness altogether.

Remember that your harness is only as reliable as the knot you use to tie yourself into it. Make sure you know how to tie into your harness correctly. Read, understand and follow the manufacturer's instructions that come with the harness. Be careful -- different styles have different tie-in procedures. It is your responsibility to know how to use your harness correctly, along with all of your other climbing gear.

Harness Care

Protect your harness from direct sunlight, heat and harsh chemicals like bleach. Wash your harness in cool water with mild, non-detergent soap. Always check your harness before you climb for frayed stitching, cuts or other forms of damage.

Remember that your harness will not last forever. If you climb every weekend, your harness should last a couple of years. The harder you climb and the more often you fall, the weaker your harness will become. Replace your harness whenever it shows signs of wear or damage.

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The Climbing Helmet

You see them everywhere, on cyclists, inline skaters, skateboarders and skiers. More and more people are strapping on helmets.

Why Wear a Helmet?

The reasons may be "painfully" obvious:

- Rocks are harder than your head. In some climbing areas, they tend to lurk above you, just waiting for a scalp to land on!
- On ice climbs, sharp tools and flying ice chunks frequently come close to your head.
- A fall with a pendulum into the wall or an unexpected bash into a low roof can potentially ruin your day if your head is unprotected.
- You never know when your climbing partner is going to lose that carabiner or piece of pro while you're standing directly below.

A helmet can protect you from all of these head-banging mishaps.

Helmet Designs

The majority of climbing helmets represent two basic styles:

- Plastic shells with internal webbing suspension
- Plastic shells with polystyrene foam liners

Both are designed to absorb impact. Internal strapping systems stretch, while polystyrene liners deform and become compacted.

Webbing suspension has been standard for many years. In addition to dissipating impact force, it offers the advantages of being adjustable to variable head sizes and allowing good ventilation between the plastic shell and the wearer's head.

Polystyrene foam construction is newer in climbing helmets but has been standard in cycling helmets for some time. These helmets are usually available in different shell sizes, and the fit is fine-tuned by adding pads to the inside. They are very lightweight and comfortable.

How Do You Choose a Helmet?

You know that wearing a helmet is using your head. Now to find one you can live with! The most important things to think about are where you climb most often and what your comfort requirements are. Consider the following:

- **Fit**—If you've ever worn a bike helmet you know that fit is essential. Any helmet, (including one for climbing), needs to cover your head and stay in place. Too tight or too large and it will become a nuisance, one you may end up leaving at home or in the car.
- **Adjustability**—Most climbing helmets are offered in one size that can be adjusted to fit. If you'll be sharing the helmet with anyone or wearing a hat on colder days, you want the

helmet to adjust quickly and easily. The Petzl Ecrin Roc, for example, features an adjustment wheel that can be moved while the helmet is on your head.

- **Feel**—If possible, try on helmets at your local outfitter. Make sure you put the helmet on straight down on top of the crown of your head. The front brim should be straight across the forehead. Tilting the helmet backwards, although jaunty-looking, leaves your forehead unprotected from rock fall.
- **Ventilation**—Think about where you will be using the helmet. If you climb in typically hot areas, will it be cool enough? Look for a helmet with a generous number of air vents.
- **Layering**—For colder climates or alpine climbs, think about warmth. Will a hat fit comfortably underneath? A balaclava, typically thinner than a hat, makes a good layering piece underneath a helmet.
- **Alpine climbing**—If you spend your time on all-day alpine climbs with pre-dawn starts, look for a helmet with clips or straps for attaching your headlamp. The Edelrid Ultralight and Black Diamond Half Dome are 2 helmets with this feature.
- **Sport climbing**—If you typically spend your time at the sport crags, you may want to try a lightweight helmet, such as the polystyrene-lined Petzl Meteor.

Accept No Substitutes!

Do not use helmets not specifically designed for climbing, such as paddling or bike helmets, for rock climbing, since they are not rated for the same types of impacts. Climbing helmets meet standards set by the CEN (European Committee for Standardization) and UIAA (Union Internationale des Associations d'Alpinisme). The helmets are tested for shock and energy absorption, conical impact, and security of retention straps and for ventilation. The CEN assures that these products go through quality control testing as well.

Retirement

Helmets have a limited life span. They should be retired…

- if they have been dented, cracked or damaged in any way, including the straps.
- after a serious impact, even if they don't show outward signs of damage.
- after five years, mainly because UV radiation from sunlight weakens the materials.

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Ropes

Wide selections of ropes exist for rock, ice and mountaineering climbs. Ropes have certain characteristics for caving, rescue, fixed-line and other uses. Here's how to choose the right one:

Step #1: Make a Few Basic Decisions

Static (Low Elongation) vs. Dynamic Ropes - All ropes used for top-roping or lead climbing[1] must be dynamic. Dynamic ropes stretch when fallen on, absorbing shock and dissipating the energy generated by the fall. Static ropes provide minimal stretch. They're typically used for activities like caving, rappelling and hauling where there is no chance of significant impact loading. Static ropes can however be used for top-rope climbing as long as you make sure that no slack builds up between the climber and the belayer but is still not advised and not allowed at all under the BSA climbing program.

Single vs. Double Dynamic Ropes - Single ropes are designed to be a climber's sole connection to their protection system. They're best suited for straight-up routes with little zigzagging. Single ropes are lighter than two double ropes used together, and they're the most common choice for climbing in the US. Single ropes are identified by the number "1" inside a circle on the label at either end of the rope. They vary in diameter from 9.8 to 11 millimeters.

Double ropes or also called half ropes, are designed to be used in pairs. They're designed to be clipped alternately through protection pieces on complicated routes, reducing rope drag and decreasing the risk of rope failure. Double ropes allow for longer rappels than a single rope, and they can also be used singly in certain situations (like basic glacier climbs where the risk of severe falls is absent). They range from 8.2 to 9 millimeters in diameter, and they're identified by the fraction "1/2" inside a circle on the label at either end of the rope.

NOTE: Double ropes are designed to be used in matching pairs (sizes, lengths and brands). Using a mismatched pair will cause undue wear on one of the ropes, exposing you to a higher risk of rope failure.

Dry vs. Non-dry Ropes - When a rope absorbs water, it becomes heavier and less able to absorb the forces generated in a fall. In cold conditions, absorbed water can freeze, making a rope stiff and unmanageable (ice crystals can also reduce rope strength). With "Dry" ropes, the mantle is treated with a water-repellent coating to reduce water absorption. They won't saturate as quickly as "non-dry" ropes when exposed to water, so they remain stronger and lighter. Keep in mind that "dry" treatments do not stop water absorption completely, and that treatments wear off over time as a result of normal rope use.

You can buy rope treatment products that can be used to rejuvenate worn dry rope coatings.

Step #2: Consider the Basic Variables

Note: Dynamic ropes use the metric M.K.S. system for the basic characteristics of diameter, length and forces. Static rope characteristics however, are usually specified in US inches and feet for diameter and length respectively and forgo any mention of forces.

[1] See footnotes on pp.29 for more detail.

- **Diameter** -- In general, the thicker a rope's diameter, the stronger it will be and the longer it will last (all other factors being equal). Smaller diameter ropes are lighter and easier to clip into protection, however, making them very popular for advanced lead climbing.

- **Length** -- You can travel farther on each pitch (and each rappel) with a longer rope. But shorter ropes will weigh less and take up less space in your gear bag. Common lengths for dynamic ropes are 50m, 55m and 60m long. For static ropes, 150', 300' and even 600' are typical.

- **Strength** -- Dynamic ropes are typically rated for both "static elongation" and "maximum impact force". Static elongation refers to the amount a rope stretches when weighted with a standard weight load of 80kg/176lbs. Common values are 6% to 8% elongation. Maximum impact force refers to the amount of force transmitted to a climber during a fall. These values typically range from 6kN to 11kN of force.

  For dynamic ropes, low elongation rating means that a rope will not stretch much (which can be useful in aid climbing), while a higher rating means the rope stretches more and will cushion the impact of a fall on a climber's body.

  A dynamic rope with a low maximum impact force absorbs more of the energy generated in a fall over a longer period of time, transmitting less to the climber and the protection system. However, that low impact force is a product of more rope stretch, which increases your chances of hitting the ground or a rock ledge during a fall if not accounted for.

  Static ropes have virtually no stretch at all (1% to 2% at the same load) and thus, the reason they should never be used is a situation to arrest a fall.

- **Construction** -- Climbing ropes have kernmantle constructions; a tough, inner core (kern) covered by an outer sheath (mantle). The core is the main load-bearing element of the rope. The sheath is braided tightly around the outside of the core to protect it against abrasion.

  Different ropes have different sheath weaves, which can affect their durability and the "hand" or feel of the rope. Some ropes have weave pattern changes at their midpoints to make it easier for climbers to find the middle (which is convenient when rappelling).

- **Flexibility** -- A rope's flexibility affects how easy it is to handle and how easy it is to tie in knots. Some climbers prefer more flexible ropes, because they're easier to tie. But when loaded, those knots can become difficult to untie. Others prefer stiffer ropes because they're easier to thread through different climbing gear pieces and because knots tied in them are easier to get out. Flexibility is largely a matter of personal preference.

Rope Care and Safety

- **Keep your rope clean** - Dirt particles are extremely abrasive to ropes. Keep your rope off the ground at all times, and flake it out on a tarp when climbing. Avoid stepping on your rope, since doing so can drive dirt particles deeper into the rope surface. Be especially careful around your rope when wearing crampons.

- **Care for your rope correctly** -- Wash your rope in cold water with a mild, non-detergent soap. Rinse thoroughly and air dry. Never bleach or machine dry your rope. Store it loosely in a rope bag when you're not using it, away from heat, sunlight and harsh chemicals.
- **Use your rope correctly** - Climbing ropes are designed for climbing only. Don't use one for anything else (like roofing, tree-trimming or towing a car).
- **Use proper rappelling techniques** -- Forget movie-style rappels. High-speed, smokin' rappels damage your rope sheath, and bounding rappels create extremely high loads on your anchors and rope.
- **Check your gear carefully** -- Before and after every climb, check your rope for signs of abrasion and/or sheath damage. While you're at it, check the rest of your climbing gear as well for signs of wear. Retire anything that shows damage.

Rope retirement
The useful life of your climbing rope will depend on how often and how hard you use it. Ropes are not cheap, but neither is your life. Follow these basic retirement guidelines even if your rope shows no visible signs of wear:

- **Occasional use** (every other weekend or less) -- replace after 4 years.
- **Weekend Climbing** -- Replace after 2 years.
- **Sport Climbing** -- The repeated short falls typically encountered when working sport climbing routes can be very hard on a rope. Replace every few months to every half year. Many climbing gyms replace ropes every few weeks.
- **Hard Falls** -- Replace your rope after ANY hard fall. Also replace it if it has flat or soft spots, becomes stiff or shows sheath damage.
- **In Doubt?** -- If you're not sure, replace it!

So, how do you know all this detail of the rope's use? You ask…

Maintain Records
An accurate written history of a rope is of vital importance to those deciding weather that rope is safe to use. Enter information about a rope in an equipment history log book, beginning with the purchase of the rope and including factors such as the rope's exposure to weather conditions, the number and severity of falls, the number of participant uses including the length of time it was used, and the type of use (belaying, rappelling, climbing, rescue, etc.). This level of record keeping is not only expected of an experienced climber, it is required under the BSA climbing program.

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Webbing and Accessory Cord

Climbing gear is pretty simple when you're bouldering. You have your personal gear; shoes, harness, and possibly some chalk and a chalk bag. For gym climbing, add a rope, a belay device and a couple of 'biners. When you get into outdoor top-roping, traditional lead climbing or mountaineering, however, you suddenly need more gear. Webbing and accessory cord make up a good part of this bulk.

- Webbing and accessory cord are vital links in any climbing set-up. Webbing is typically used to make anchors and runners, and accessory cord is often used for emergency purposes.
- Webbing is made of tubular nylon which meets minimum military or climbing specifications. Either is appropriate for climbing.
- Accessory cord is made with kernmantle construction similar to climbing rope. Accessory cord is static, however, and does not stretch to absorb the impact of a fall.
- Webbing and accessory cord are best cut with a hot knife at the store when you buy them. You can also easily cut and finish the ends at home, if you prefer.
- The water knot and the double fisherman's knot are recommended knots for webbing and cord.

Uses for Webbing and Accessory Cord

Webbing is used primarily for anchoring your rope to the rock face or mountain. Sections of webbing are typically tied into loops known as runners (or slings.) Runners are used as links between your rope and the anchors you place in the rock or snow.

Webbing

Runners are available pre-sewn or can be made by tying lengths of webbing into loops. Each type has its advantages. Tied runners can be untied and threaded through natural anchors, or several runners can be tied together into one large runner as needed. Tied runners are also less expensive than sewn runners.

Three sizes of tied runners are typically used:

- Singles are used most often to attach your rope to your protection, as long as the route is fairly straight.

- Doubles are also used to clip in the rope, but on routes where protection doesn't run up in a straight line. The longer runners allow the rope to remain straighter, which means less drag on the rope and easier leading. Double runners are also frequently used for belay anchors and top-rope anchors.

- Triples are used less often, but it's good to have one on your rack on a long climb. They can be very useful for setting up anchors in difficult places.

To make the three sizes of tied runners, cut the following lengths of webbing:

- Single runner: 5.5 feet
- Double runner: 9.5 feet
- Triple runner: 14 feet

Sewn runners are stronger than tied runners because tying knots in webbing reduces its overall strength. Sewn runners are less bulky than tied runners, but they are more expensive. Your budget, climbing style and end use will determine which you select.

Accessory Cord

Both webbing and cord can be used to make runners, although webbing is typically used. Accessory cord has the following additional uses:

- **Prusik slings**—The prusik is a friction knot made by wrapping a smaller-diameter (6 or 7mm) loop of accessory cord through itself around a larger-diameter (9 to 11mm) rope. Its purpose is to grab the rope when weight is put on it, but to slide along the rope when unweighted. Prusik knots are used on "hero loops"—short runners that climbers use as a belay backup so they can assist an injured climber. They are also used on feet and torso prusik slings, which a fallen climber uses as ascenders to get out of a crevasse.
- **Chock slings**—5.5mm Spectra® or Spectra/Kevlar® cord is used for slinging chocks such as Black Diamond hexentrics that don't come with wires already attached.
- **Cordelette**—A cordelette is a long runner constructed of a 16-foot length of 6mm Spectra® cord, tied with a triple fisherman's knot. The extra length of this runner is useful for making an equalized anchor off of multiple pieces of protection or for wrapping around large natural anchors such as trees or boulders.

Construction and Materials

Webbing

Climbing webbing appears to be flat. It actually starts out as a woven tube that is then flattened to form a double thickness. For this reason it is sometimes referred to as tubular nylon webbing. (Note: Flat nylon webbing, used in a variety of camping uses, is a single thickness and is not strong enough for climbing use.)

Climbing webbing comes in two strengths: "mil spec" and Climb-Spec™. Most webbing in the U.S. is made for use in the military. Mil-spec refers to the minimum specifications that the government sets for military webbing used in life support situations. The weaving process gives mil-spec webbing a corduroy-like finish.

Climb-Spec webbing was designed by Blue Water climbing ropes in 1985 specifically to exceed the requirements of standard military-spec webbing. Because a different weaving technique is used, it has a smooth finish. Climb-spec webbing is more abrasion-resistant and stronger than mil-spec webbing. Both kinds of webbing are suitable for climbing.

Webbing is sold in 9/16", 1" and 2" widths. Narrower webbing is lighter-weight and less bulky.

9/16" is used for slinging protection and for making tied runners and quick draws. Wider webbing is more durable, making it great for fixed anchors and top-roping. One-inch webbing is the most commonly used size for tied runners and anchors. Two-inch width is generally used for making substantial anchors for rescue situations.

Accessory Cord

Accessory cord looks like miniature climbing rope. In fact, it's made with the same kernmantle construction—that is, a fiber core (kern) covered with a colorful, braided sheath (mantle). Accessory cord is static (or non-stretchy), whereas climbing rope is dynamic and will stretch to absorb the impact of a fall. Even the largest-diameter accessory cord should never be used as climbing rope.

Accessory cord is typically made of one or a combination of three fibers:

- **Perlon**—This is a European fiber very similar to nylon, often used in accessory cord. Climbers sometimes refer to accessory cord simply as perlon, regardless of the cord's content. Perlon measuring 5mm to7mm is typically used to make prusik slings—loops that are wrapped around the climbing rope to form friction knots.

- **Spectra**®—Spectra, made by Allied Signal Corp., is an extremely strong fiber used in many applications. Climbing cord is just one. Blue Water Titan™ Cord combines the high strength of Spectra fibers in the core with a 100% Caprolan® 2000 nylon (also made by Allied Signal) sheath for durability. In addition to its high strength, Spectra fiber is resistant to damage by repeated flexing. The extra strength of Spectra cord is desirable for chock slings, but its slippery texture makes it less appropriate for prusiks.

- **Kevlar**®—This incredibly strong, cut-resistant fiber made by DuPont is most well-known for its use in bulletproof vests. Kevlar by itself does not withstand repeated flexing, so it is usually combined with Spectra in accessory cord. It is best used for making chock slings.

Cutting

When practical, order various lengths separately so that the ends of your cord and webbing will be cut and finished with a hot knife, preventing unraveling.

If you prefer to buy one long piece and cut the sections yourself, it's easy to do so. You'll need some sharp scissors, a heat source, such as a lighter or candle flame, and an old knife.

Webbing—Cut with scissors and melt the end in the flame. Use the knife to smooth down the melted edges.

Accessory Cord—Cut about an inch longer than you need. Work a half inch of the core out of the sheath and cut it off. Smooth the sheath back and melt it into a smooth, hard "cap" on the end of the cord. This method of finishing will allow the cord to fit into the holes drilled in hexentrics. To get a clean cut on Spectra® cord, it may be necessary to use cable cutters.

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Tying

Webbing

Webbing is typically tied with a water knot, also known as a ring bend. Webbing often has one solid-color side and one side with a dashed line running down the center. These markings help to match up the webbing when making knots. To make a water knot, first make an overhand knot in one end of the webbing. Then with the other end, retrace the knot backwards, matching solid color to solid color, or dotted line to dotted line.

Accessory Cord

Accessory cord is usually tied into runners with a fisherman's knot. For perlon or nylon a double-wrapped fisherman's knot is used. A triple fisherman's knot is recommended on Spectra and Kevlar due to their slippery textures. The extra wrap minimizes any chance of the knot slipping.

NOTE: Make sure you leave at least a 2 inch tail on each end and check your knots occasionally—they can loosen up with time.

Marking

Only so many colors of webbing and cord are made each year, and yours might start to look like everyone else's at the crags. Mark your gear so you're sure to get it back at the end of the climb. On runners, write your initials and the date you made them with marker. You can use a marker for accessory cord, but it might be easier to use colored electrician's tape on the round surface. Be sure to mark the tails of your runners and prusik loops, rather than the working surfaces.

Retirement

Just like climbing rope, accessory cord and webbing eventually need to be retired. Keep track of when you make your runners and retire them after each season of hard climbing, or every other year if you don't use them that often. Be sure to inspect your webbing and cord before each climb for any signs of damage and retire any suspect runners. This is also a good time to check all your knots. Note: Both Kevlar and Spectra become stiff and weakened by exposure to UV radiation and should be retired after 100 days of use.

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Runners

Runners are open loops of webbing used for both sport and traditional climbing. They are used to make belay and top-rope anchors, and as links between the rope to bolts or pieces of protection. Runners help keep nuts or camming devices from being dislodged by excessive movement of the rope. On all lead climbs, they are used to keep the rope running as straight as possible to avoid the annoying and sometimes dangerous rope drag on the lead climber.

Comparing Tied and Sewn Runners

Runners can be tied from lengths of webbing or purchased pre-sewn. You may wonder which ones to use. Each type has its pros and cons:

Tied Runners
Advantages:

- May be untied and retied, making them suitable for anchoring around large trees or rocks, or adjusting the length as necessary
- Inexpensive to make
- Can be left behind as rappel anchors without a great loss

Disadvantages:

- Heavier
- Bulkier
- Not as strong as sewn runners

Sewn Runners
Advantages:

- Lighter
- Less bulk
- Stronger

Disadvantages:

- Often too short for use as anchors
- Expensive (especially for leaving behind as your rappel anchor)
- Can't be untied to go around natural features such as rocks or trees; should never be cut and retied

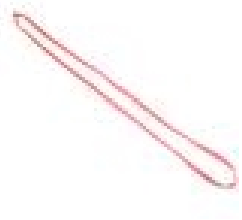
Many climbers use a mixture of sewn and tied runners for the greatest versatility.

Types of Sewn Runners

Sewn runners come in a variety of shapes and lengths and have multiple uses. Some short sewn runners are referred to as "quickdraws." This is probably because the climber looks as if he or she is drawing a pistol from its holster when pulling one of these runners (with a carabiner attached on either end) off the harness.

Climbing Gear Selection Essentials

Open Runners
Open runners are lengths of webbing sewn into loops. They are used most often on traditional climbs for making anchors and for clipping in the rope. They come in some longer lengths to keep the rope in a straight line if protection must be placed off to one side.



Examples: REI and BlueWater Titan Spectra® runners are two types of open runners. BlueWater runners come in 4-, 6-, 12-, 24-, 36- and 48-inch lengths. REI open runners come in 25, 60 and 120cm lengths (roughly equivalent to 10, 24 and 47 inches, respectively).

REI runners are made of nylon. BlueWater Titan runners are made from a combination of Allied Signal Spectra® and Caprolan® nylon fibers that offer higher strength than nylon alone.

Caution - Spectra-blend webbing has a somewhat slippery finish and does not hold knots as well as 100% nylon webbing. Spectra runners should **NEVER** be cut and made into tied runners! The Spectra fibers may cause the knot to slip under very low loads.

Symmetrical Quickdraws
Symmetrical quickdraws are runners that have been bar-tacked through the center, creating an equal-size loop on each end for clipping carabiners. The resulting shape is like a bow tie or a bone; hence the name for BlueWater's Dog Bones. The loops on these quickdraws are loose enough to allow you to flip carabiners into the right position when necessary.

Examples: BlueWater, Titan Dog, Bones, and REI symmetrical runners are examples of these quickdraws. They are typically used on sport climbs but can also be useful for traditional climbing.

Asymmetrical Quickdraws
These quickdraws for sport climbing are bar-tacked close to one end, forming one very small and one large, open loop. The small loop holds a bent-gate carabiner tightly, which steadies it for clipping in the rope quickly. The larger loop allows the top carabiner to be flipped over in a bolt hanger, if needed.

Examples: BlueWater Titan Speed Draws, REI asymmetrical slings and Petzl quickdraws are examples of asymmetrical quickdraws. The BlueWater runners come in a 5-inch length only. REI models come in roughly 4-, 6- and 8-inch length, (although they are sold in centimeters), and the Petzl quickdraws are available in 11, 17, and 25cm lengths. Petzl quickdraws are different in that they feature tapered ends to allow the carabiners to be flipped over easily. They also have a rubber piece called a "string" that protects the runner from wear and holds the carabiner more tightly for rope clipping.

Shock-Absorbing Runners
Shock-absorbing runners are designed to reduce the load placed on a climbing system. They are made of long runners that have been folded several times and stitched in place. When the rope is shock-loaded from a fall, the stitching in these folds rips out, absorbing some of the impact. The most common use of shock-absorbing runners is on marginal protection placements, either on questionable rock or with very small pieces of protection such as small nuts or old 1/4" bolts.

Example: Yates Screamers are an example of energy-absorbing runners. Screamers provide added protection in climbing and rescue situations. They not only absorb energy directly because of the stitch-ripping effect; they also allow the rope to absorb more energy from the fall by increasing the interval of the fall or shock-loading of the rescue system. The standard Screamer can effectively reduce peak loads by 3-4 kilonewtons in any climbing system.

Asymmetrical Runners with Carabiners Attached
(aka Quickdraw Sets)
Some climbers like the convenience of ready-made quickdraw sets, or quickdraws with carabiners attached, rather than buying quickdraws and 'biners separately. Because of their short lengths, these sets are ideal for sport climbing when ascending fairly straight routes.

Examples: REI, Black Diamond, Hugh Banner and Metolius all make a verity of quickdraws.

Climbing Gear Selection Essentials

Carabiners

Carabiners are lightweight, metal snap-links used by climbers for a wide variety of climbing tasks. They come in a range of styles, sizes and designs. To choose and use them properly, you must first understand the differences between them.

'Biner 101

Carabiners are built to connect things together; whether it's a climber to her rope, a rope to a piece of protection or a collection of protection pieces to a climbing harness. They're strong, because they have to be able to withstand extreme forces (and because lives often depend on them). They're light so that climbers carry a bunch of them without getting weighted down.

Different climbing tasks require different kinds of carabiners. The variables that typically distinguish styles include shape, gate-type, strength, weight and size.

Step #1: Consider Your Shape Options

Oval -- Oval carabiners are the original style. They're versatile and affordable, though not quite as strong as other shape options. Oval 'biners have smooth, uniform top and bottom curves to limit load shifting.

"D"-Shaped -- D-shaped 'biners are designed to shift weight loads toward the spine (the strongest part of the 'biner) and away from the gate (the weakest part). As a result, they have excellent strength-to-weight ratios. Ds are lighter and stronger than ovals of the same size and material. Because of their shape just above the gate, they are also easier to clip into protection pieces.

Asymmetrical "D" -- Asymmetrical Ds work like regular Ds, but they're slightly smaller at one end to further reduce weight. Asymmetrical 'biners generally have larger gate openings than regular Ds, which makes clipping them even easier. But they don't have as much inside room as similarly-sized Ds or ovals.

Step #2: Consider Your Gate Options

Straight - Standard straight gates are by far the most common type. They're perfectly straight from pivot point to end. Like most other types, they're spring-loaded to open easily when pushed, but rotate closed automatically when released.

Bent-gate -- Bent-gate 'biners have concave gates designed to make clipping into protection easier. The bent-gate design does not significantly affect the 'biner's strength or its weight. But if not used properly, bent-gate 'biners can unclip from your rope. As with any other kind of climbing equipment, you must learn how to use bent-gate 'biners correctly in order to be safe.

NOTE: Bent gate carabiners should only be used on the end of the quickdraw or runner, which clips into to rope. Never clip them directly to the protection.

Locking -- Locking 'biners have gates that can be locked in the closed position to provide extra protection against accidental gate-openings. They should be used anytime you depend on a single carabiner for safety, such as during a rappel, while belaying, or at your

first piece of protection. Carabeners with locking gates must be used at all times under the BSA climbing program.

Locking 'biners can be oval, D-shaped or asymmetrical. The locking devices themselves range from simple threaded collars that screw down over the gate to spring-loaded, "automatic" mechanisms.

Wire-Gate -- Wire-gate 'biners use a loop of stainless steel wire for a gate. This wire loop creates its own spring mechanism as it pivots, decreasing overall weight and eliminating the need for extra parts found in conventional gates. Wire gate designs also allow for larger gate openings.

Although wire gates don't appear as strong as conventional styles, most are. They are also less likely to vibrate open during a fall due to the lower mass in the gate itself.

Step #3: Consider Your Needs

The most important factor to consider when choosing carabiners is how you'll be using them. Different styles are designed for different tasks. If you're just starting out, ask a climbing instructor or an experienced salesperson for guidance on which styles to start with. If you're a more experienced climber, consider the kinds of climbing you want to do, the kinds of protection you'll be clipping into and the kinds of tasks you'll need your 'biners to perform.

Step #4: Overall Performance

Strength

NOTE: Because a falling climber is a mass accelerating under the pull of gravity, carabiner (as well as most all climbing hardware) strengths are measured in kiloNewtons (kNs), a measure of force (mass times acceleration). For conversion purposes, 1 kN is approximately equal to the force of 225 lbs.

Carabiners are designed to be loaded along their long ("major") axis with their gates closed. When loaded correctly, all carabiners are built strong enough to handle the loads found in normal climbing situations.

Unfortunately, carabiners can fail at loads well below their rated strength when they're used incorrectly or if they're loaded with their gates open.

Gate Lash

The dynamics of just about any climbing fall can cause "gate lash" (a momentary opening of a carabiner's gate caused by vibration or the spine hitting a solid object). Gate lash can reduce a 'biner's overall strength to its open-gate strength. It can occur when:

- A gate's inertia overcomes the spring tension holding it in place
- A gate collides with another object

To protect yourself against this type of carabiner failure, choose carabiners with locking gates and/or high gate-open strengths. Check specifications for both gate-closed and gate-open strength ratings for your safety and more importantly, learn how to use your carabiners correctly. Specific gate designs and/or stiff spring tensions may also reduce the risk of gate lash.

Weight
In general, the less weight you carry with you as you climb, the better. But lighter carabiners are not always better than heavier ones. Super-light carabiners often use narrower rod stock, which can result in lower gate-open strengths and shorter life spans. Narrow 'biners can also cause more rope wear, since the narrow ends can act like edges, biting into your weighted rope as it slides past.

Size
Carabiners also come in a variety of sizes. Large 'biners are typically easier to handle, easier to clip (they have larger gate openings) and can hold more gear inside. They are commonly used with belay and rappel devices. Smaller 'biners are lighter and take up less room on your rack.

Step #5: Get a Feel for Your Options

Once you've narrowed down your search to a handful of carabiner styles, grab a few examples and get a feel for how they fit in your hand, how easy they are to clip and unclip, and how smoothly the gates work. If you're looking at a locking 'biner, try locking and unlocking the gate a few times (with one hand). Choose models that feel good, operate smoothly and are easy to work with.

Safety Tip: Inspecting Your Carabiners for Damage

- Check all surfaces of your carabiners for cracks, sharp edges, corrosion, burrs or excessive wear. Even hairline cracks can reduce 'biner strength by more than 50%.
- Check each gate to make sure it opens and closes quickly and easily. Be sure all gates (and any locking mechanisms) close freely and completely.
- Make sure no rivets are bent or missing.

If any of your carabiners don't pass the above inspection, remove them from service and destroy them. Also, retire any carabiner that has been dropped a significant distance (over 20 feet), especially if its gate ceases to function properly. Dropped 'biners can suffer significant damage yet still appear intact. If you are unsure about the condition of any 'biner that has been dropped, consult a climbing expert for advice before using it again.

Safety Tip: Basic 'Biner Care

To get the most out of your carabiners, keep them clean and free of grit. If you notice a sticky gate, wash it in warm, soapy water, rinse it thoroughly and lubricate it with dry graphite WD40 or a similar lubricant around the hinge area, the spring hole and the locking mechanism. Be sure to wipe off all excess lubricant. Don't store your 'biners in humid or salty air, with damp equipment or clothing, or near corrosive chemicals. Don't file your carabiners for any reason (sand down burrs with 220 to 400 grade sandpaper. If this doesn't remove the burr, destroy the 'biner).

Climbing Gear Selection Essentials

Belay Devices

If you're going to do any climbing beyond bouldering, you're going to need to know how to belay. Belaying is one of the most critical of climbing skills because you have your partner's safety—and possibly even his or her life—in your hands.

In belaying, you control the rope's movement to protect the climber at the other end. You can do this without a belay device but having one definitely makes the job easier. A belay device acts as a brake on the climbing rope by applying friction to it. The device, plus the belayer's quick "braking hand" locks off the free end of the rope to stop the climber's fall.

Types of Belay/Rappel Devices

Assorted belay devices are available. Which one you choose depends on the kind of climbing you do.

Tubular

These models are the most widely used belay devices. Their shape is best described as an oversized thimble with twin holes in the bottom. The rope is folded and pushed through the device and clipped with a locking carabiner to the belayer or directly to the anchor. The bend in the rope and its contact with the device put friction on the rope to slow it down. These devices are suitable for any kind of climbing.

Advantages: Tubes or cones are compact, light and easy to use. They work with many rope diameters and can accommodate single or double ropes. They don't twist or kink ropes and they can be used for rappelling as well as belaying.

Drawbacks: Some people, especially lighter-weight climbers, find tubular belay devices to be slow for rappelling.

Examples: The Black Diamond ATC (Air Traffic Controller), the Hugh Banner Sheriff, the Trango Pyramid and the Trango Jaws. All devices have a plastic or aluminum loop on one end to keep the device attached to the carabiner when you insert or remove the rope. The Trango Jaws device is a bit more specialized, providing twin notches on one side for locking off the rope to hold a fall securely.

Auto-locking

Auto-locking belay devices have a mechanism that locks down on the rope when a sudden force is applied to it. They operate much like your car's seatbelts. The rope is threaded through the inside of the device, which is clipped to the anchor or the belayer. These devices are used mainly for sport climbing, either at gyms or climbing areas.

Advantages: Since these devices automatically lock when the climber falls, they do not require any stopping force from the belayer's hand. They feed rope smoothly and are easy to operate for lowering the climber.

Drawbacks: Auto-locking devices put high shock loads on the rope during a fall. As a result,

they should not be used for lead climbing and only with extremely secure top-rope anchors. They should only be used with supple, 10 or 11mm ropes. They don't function with wet or icy ropes.

Example: The Petzl Grigri is a very popular auto-locking device used in many gyms and by sport climbers.

Figure 8

These are shaped like the number eight, as the name implies, with one larger and one smaller hole. A bight (bend) of rope is fed through the large hole and looped around the outside of the small hole till it rests on the "neck" of the figure 8. The small hole is clipped to the climber or anchor. Figure 8's are frequently used for search and rescue, caving, and traditional climbing as rappel devices. As belay devices, they are limited to top-roped situations.

Advantages: Figure 8s are very efficient and smooth for rappelling, dissipate heat efficiently and can be used with just about any rope diameter.

Drawbacks: As belay devices, figure 8's offer inadequate braking for anything but top-roping (unless used like a belay plate with rope going only through the small hole). They also require more attention and more force from the belayer's hand than other devices, and they put a twist in the climbing rope, which can make rope handling difficult.

Examples: The Black Diamond Super 8 and the Hugh Banner Hard Anodized Figure 8 are figure 8's that can be used for belaying as well as rappelling.

Other Belay Options

So, you top out on the pitch you just led, you're setting up to belay your partner and you suddenly have one of those moments when you wish you'd stayed home: You've dropped your belay device. Now what?

Luckily for you, you snap out of your disbelief and remember the two ways of belaying without a device. Enter the Münter hitch and the body belay!

Münter Hitch—The Münter hitch is a belay "device" made out of the climbing rope. It's created by artfully arranging two loops of the climbing rope around a large locking carabiner into what is known as a running knot. The rope feeds through this knot in either direction. If the climber falls, the belayer pulls on the rope's free end and the knot acts as a friction lock-off. The Münter hitch is a very fast and efficient way of reeling in a lot of rope.

There are some drawbacks to this method, which is why it is reserved as a backup. It requires a forceful brake hand and is not always reliable for stopping long leader falls. You need a large, pear-shaped locking carabiner that will allow the knot to slide through easily. It will not work with a regular locking D. Moreover, like the figure 8, it puts kinks and twists in the rope.

Body Belay—As the name implies, your body acts as the belay "device" that puts friction on the climbing rope. This is the simplest belay method, as it requires no special equipment. The rope is anchored behind the belayer and is wrapped around his or her waist, typically with a carabiner clipped to the harness waistbelt to keep the rope from sliding up the back. If the climber falls, the seated belayer pulls the braking hand quickly and forcefully across his or her body to the ground. While simple to set up, the body belay requires proper-seated position, proper arm movements and strength. It can also be uncomfortable for the belayer to take all the climber's weight on his or her body. For these reasons, the body belay is used as a last resort.

To learn more about belaying and belay devices, take a look at instructional books such as "Mountaineering: The Freedom of the Hills," published by the Mountaineers, or "How to Rock Climb," by John Long.

Climbing Gear Selection Essentials

Passive Protection Devices

When you're on the "sharp end" of the rope (that is, leading), there's nothing like placing a snug-fitting anchor to build your confidence. These anchors, known as protection, are the link between your rope and the rock. They are divided into passive and active varieties. This section will address passive protection.

1. Passive protection pieces have no moving parts. They consist of aluminum pieces in various shapes attached to braided wires, cords or webbing slings.
2. Tapers are wedge-shaped pieces that are typically placed in the narrowest part of tapering cracks
3. Camming chocks, rounded pieces that become locked in place when twisted or "cammed," are good choices for large or straight-sided cracks.
4. Passive protection pieces are lighter, less bulky and less expensive than their spring-loaded cousins.

Passive Protection Choices

Tapers and camming chocks make up the quiver of climbing gear known as passive protection. They are commonly referred to as nuts, stoppers, tricams and hexes. These variously shaped chunks of aluminum all share one characteristic—they have no moving parts. They are attached to either a wire cable, a loop of accessory cord or a sewn webbing sling.

Tapers

As their name implies, these aluminum pieces are larger at one end and become smaller at the other. They are designed to slide into tapering cracks and wedge into the narrowest part. Tapers typically work the best in narrow-to medium-width cracks. The best placement occurs when the most surface area of the chock is in contact with the rock. Because of their wedge shape, they are not as well suited to parallel-sided cracks.

Tapers typically have slightly curved faces. One side is convex and the opposite is concave. The convex side locks against the two contact points of the concave side, creating a stable triangulation of forces. Some tapers, such as DMM Wallnuts, have cutout areas for better fit in uneven rock surfaces.

Black Diamond “Stopper” Size Chart

SIZE	RANGE INCHES	WEIGHT GRAMS	STRENGTH KN
1	.17-.36	7	2
2	.19-.39	8	2
3	.24-.45	15	5
4	.27-.49	16	6
5	.33-.53	18	6
6	.40-.61	32	10
7	.46-.64	34	10
8	.53-.72	37	10
9	.60-.82	39	10
10	.68-.92	43	10
11	.79-1.05	51	10
12	.90-1.20	58	10
13	1.04-1.38	71	10

Climbing Gear Selection Essentials

Micro Nuts
Micro nuts are a smaller type of taper. They are reserved for thin cracks or old piton scars when no other protection will fit. They are as much as 75 percent smaller than most standard tapers.

Examples:

- **Hugh Banner Brass Offset Nuts**—These micros are tapered in two directions. They are good for thin, flaring cracks. Made of soft brass, they deform into the rock when force is applied. This is appropriate on softer rock formations because harder metals tend to shear off such rock.

- **Black Diamond Swedge Nuts**—Made of a combination of iron and copper, these micro nuts do not deform under pressure, making them a better choice for hard rock. The harder metals will tend to break off rock fragments in softer rock, however.

Camming Chocks
Camming chocks have no moving parts. Unlike tapers, though, camming chocks have the ability to rock or twist into a "locked" position in a crack or pocket. They are useful in cracks too large or straight-sided for tapers to fit well. Camming chocks are commonly placed in parallel-sided cracks, round pockets and horizontal cracks.

Tri Cams—These unique pieces are rounded on one side and come to a point on the other. They can be placed directly into cracks (like tapers) or with the sling running alongside the curved edge, cammed into place. Force applied to the sling rocks the curved edge and forces the point into the rock. Placing tricams takes practice, but once the technique is mastered, the tools are very useful. Example: Camp Tri Cams.

Camp Tri-Cam Size Chart

SIZE	RANGE INCHES	WEIGHT GRAMS (OZS)	STRENGTH KN (LBS)	COLOR
0.5	0.6-1.1	26 (.92)	10.0 (2250)	pink
1	0.8-1.2	34 (1.2)	10.0 (2250)	red
1.5	1.0-1.5	51 (1.8)	15.0 (3375)	brown
2	1.1-1.6	54 (1.9)	15.0 (3375)	purple
2.5	1.3-1.9	77 (2.7)	18.0 (4050)	royal
3	1.5-2.1	91 (3.2)	18.0 (4050)	navy
3.5	1.6-2.4	116 (4.1)	22.0 (4950)	white
4	1.8-2.5	139 (4.9)	18.0 (4050)	green
5	2.3-3.5	119 (4.2)	22.0 (4950)	orange
6	2.9-4.1	198 (7.0)	18.0 (4050)	yellow
7	3.6-5.5	264 (9.3)	16.0 (3600)	Gold

Hexentrics are asymmetrical, six-sided tubes. Like tapers, they can be placed directly into narrowing cracks. In straight-sided cracks they can also be rotated into place. Downward force on the wire or sling rotates the hex and wedges it tightly in the crack.

Examples:

- **Black Diamond Wired Hexentrics**—The wired version of this classic pro is a relatively new development. Previously, hexes were sold without the wires. Instead, climbers threaded 5.5-millimeter accessory cord through the holes machined into the hex. The newer style hexes are easier to rack, plus the thin, stiff cable works well in extremely bottlenecked rock formations. The cables are also very durable.

- **Metolius Curve Hexes**—The curved sides of these hexes allow placements over crystals or irregularities where a straight-sided hex would not fit. Each piece has four different fit options with a range that is comparable to a camming device of similar size.

Metolius Curve Hexes Size Chart (Also applies to BD Wired Hexentrics)

SIZE	RANGE INCHES	WEIGHT GRAMS(OZS)	MFG. RATED STRENGTH KN
1	.42-.61	23 (0.8)	6
2	.46-.67	26 (0.9)	6
3	.55-.79	40 (1.4)	10
4	.65-.90	45 (1.6)	10
5	.85-1.10	51 (1.8)	10
6	1.05-1.30	60 (2.1)	10
7	1.25-1.66	77 (2.7)	10
8	1.57-2.02	105 (3.7)	10
9	1.93-2.60	142 (5.0)	10
10	2.12-2.92	176 (6.2)	10

Why Passive Protection?

Why buy passive protection when spring loaded camming devices (SLCDs) are so secure and easy to place? There are actually several reasons:

- When placed in flaring cracks (cracks that get increasingly wider), SLCDs have been known to "walk" themselves out. Hexentrics are often a more secure option.

- A rack with a full set of tapers or hexes is not only lighter than one with the same number of spring-loaded cams, but it's less bulky. Plus, the pieces are less likely to get tangled.

- Occasionally a climber is forced to leave behind a piece or two of pro in order to back off a climb or to do an unexpected rappel. Most would rather leave a couple of $8 stoppers than a $60 spring-loaded camming device.

That's not to say that one should only carry passive protection. Spring-loaded camming devices have broader working ranges than tapers or hexes, and they fit in pockets and parallel cracks more readily than most passive pro.

The most versatile racks have some of each—passive and spring-loaded protection—to handle a variety of routes and types of rock. Practice and experimentation will help you decide on the best type of protection for the formations in your favorite climbing areas.

Climbing Gear Selection Essentials

Active Protection Devices

As we highlighted in the previous section, protection devices are divided into roughly two types: those with moving parts and those without. This section addresses the "movable" type known as active protection.

1. Active climbing protection features spring-loaded parts that are retracted and then expanded to fit the crack.
2. Spring-loaded camming devices (SLCDs) can be used in wide or straight-sided cracks where passive chocks and tapers often don't hold.
3. Spring-loaded tube chocks are typically reserved for cracks or pockets measuring more than six inches wide.
4. Because of their large expansion ranges, spring-loaded cams and tube chocks have more placement options than passive protection.
5. A full rack of protection that includes both active and passive protection provides the most versatility.

Climbing anchors without moving parts are collectively known as passive protection or "pro." They consist of aluminum pieces in various shapes attached to braided wires, cords or webbing slings. In contrast, active protection features moving parts. The two main types of active pro are the ubiquitous spring-loaded camming devices (also called SLCDs) and the less common spring-loaded tube chocks.

Note: Camming devices, or "Friends," are typical names for active pro. *Friend* is a brand name owned by Wild Country, but because Friends emerged as the original spring-loaded camming devices on the market, the name became synonymous with any camming device.

Spring-Loaded Camming Devices (SLCDs)

SLCDs feature three or four curved pieces of aluminum, called cams. When a spring- loaded trigger wire is pulled, these chunks of metal retract and make the device narrower. This allows a climber to slide the unit inside a crack. When the trigger is released, the cams expand to fit the rock. Placed correctly, SLCDs offer excellent hold, particularly in places where passive chocks and tapers will not.

Climbing Gear Selection Essentials

Construction
Most camming devices feature four cams. Because of their narrower profile, SLCDs with three cams are appropriate for shallower cracks. No matter the number, each cam on an SLCD is individually spring-loaded. This allows the devices to conform to irregular shapes within a crack, with each cam maintaining contact with the rock.

Active camming devices have large expansion ranges. A climber can get a single cam to fit where several different sizes of tapers or hexes might be tried before the correct size is found.

Black Diamond is the only brand of camming device (as of this writing) with double axles or pivot points for the cams. Though they add weight, the twin axles give these cams an even larger expansion range than single-axle varieties.

Rigid Stems
Some SLCDs, such as Wild Country Forged Friends, feature solid aluminum center stems. Although more durable than flexible-wire stems, rigid stems can be problematic in some placements. Take horizontal cracks, for instance. Fall forces could break a rigid-stemmed camming device unless it is placed at an adequate depth or tied off properly. It takes practice to place rigid stems correctly in these situations.

Flexible, Single-Cable Stems
Flexible stems are often the better choice for horizontal placements, but they are not as durable as rigid stems. Single cable stems are narrow enough to fit in narrow cracks or oddly-shaped pockets where other wider stems won't work.

Flexible U-stems
Like single flexible, single-cable stem varieties, U-stems are good for horizontal placements. The trigger on flexible U-shape stems can be operated with the forefinger and thumb, and some climbers find them easier to retract evenly. Some find it difficult to get their thumbs in the curved portion of the smaller size cams.

With any camming device, it's best to get them in your hands and decide for yourself which trigger action is the most comfortable. Comfort and ease of use can make a difference when you're trying to place them quickly with one hand.

Spring-Loaded Tube Chocks

These less common devices consist of spring-loaded, telescoping aluminum tubes. Squeezed together, they contract for placement inside a crack or pocket. When released they expand and hold. Expandable tube chocks are typically used in cracks or pockets more than 6 inches wide. They are commonly used in the uniform cracks found in the Southwest.

Building Your Rack

All styles of cams have their advantages and disadvantages:

- Those with extra-large size ranges tend to be heavier.
- Those with rigid stems are very durable but are not as good for horizontal placements.
- Those with flexible stems are easy to place in horizontal cracks but will wear out quickly if repeatedly fallen on in this type of placement.

Serious climbers who frequent different geological areas often buy different sets of pro to match. This is impractical (and expensive) if you're just starting to climb and build your rack. One popular concept is to select a full set (typically seven to ten pieces) of one brand of SLCDs, allowing you to become familiar with each size. Color-coded, sewn slings help reinforce what size to reach for when faced with a certain size crack.

The most versatile racks have both passive and active protection to handle a variety of routes and placement conditions. Be aware, unless placed properly, Cams can jiggle or "walk" into backward flaring cracks so deeply that they cannot be retrieved. They can also walk out of tapering cracks that widen as they go up. It's good to have passive pro on your rack for upward flaring cracks since it is less likely to be worked free by the rope's movement.

Many new climbers start out with a full set of passive tapers and hexes and add SLCDs gradually. This not only forces them to learn to place passive pro carefully, but it allows those on a budget to climb and still pay their rent.

Practice and experimentation will help you decide on the best type of protection for the formations in your favorite climbing areas.

Notes on Protection Devices

The Scout and Protection Devices

During a *Boy Scout of America* rock climbing activity, a scout is restricted to top-rope[1] climbing.

Pro devices, both passive and active, are used in lead climbing[2] (lead-roping) and as such, can only be used in the Boy Scout climbing program under the following circumstances:

- The Boy Scout is actually top-rope climbing for additional safety during his lead rope "practice" climbs. This would require two belayers.
- The pro devices are being used by the adult Scout "Lead Instructor" to initially get to the top of a climbing route for building top-rope belay anchorage.

The Scout may also develop his basic climbing skills in a BSA Climbing Program and discover a heightened interest to pursue advanced climbing techniques outside of the BSA program.

Know Your Pro Before You Climb

Before you take to the hills with your rack of shiny new hexes, nuts and camming devices, make sure you know how they work. Work with your instructor to learn how to make solid anchors and how to place protection. First, spend some time on the ground. Go to the base of a climbing cliff and figure out how to fit wedges, cams and hexes into different features in the rock.

Then try some short, easy pitches placing a variety of pieces, not just spring-loaded camming devices, which are easiest to place. Hanging on a rock face with three fingers and a couple of toes when you're 60 feet above the deck is not the best time to be wrestling with your rack, trying to figure out how to place pro!

[1] **Top-Rope Climbing** Top-rope climbing involves anchoring your climbing rope to a spot up above you, then climbing toward the anchor while your climbing partner pulls in the slack and keeps the rope relatively taut. By creating a solid anchor point and keeping the rope taut, you and your partner limit the distance you will fall if you slip off the rock. Top-rope climbing is also popular because it typically requires less equipment and experience than other forms of roped climbing.

[2] **Lead Climbing -- The Next Level**
Sometimes it's impossible to anchor your climbing rope above you before you start climbing. When this happens, you must anchor your rope to the rock as you climb to limit the distance you'll drop if you fall. Any time you climb up above your highest rope anchor point, you are said to be "lead" climbing. Lead climbing requires a lot of skill and a lot of practice. It also requires additional climbing equipment.

Climbing Gear Selection Essentials

Basics of Gear Racking

Traditional climbing requires a lead climber to place temporary anchors that the second climber removes. Typically, each climber will take turns leading and placing protection devices. This collective gear, known as the rack, is usually arranged on a padded gear sling and carried by the leader. The rack is passed back and forth, as climbers take turns leading.

- The amount of gear you need varies according to individual climbing routes.
- Make sure your gear rack fits comfortably on both you and your partner.
- Color-code your runners for easy length identification.

What Gear Should You Take?

What goes on a gear rack? It depends mostly on the area and the routes to be climbed. In some climbing areas, the rock has tiny holes or pockets, so smaller sizes of protection are appropriate. Other areas feature "off width" cracks that need very large pieces. Most often, a climb will require a variety of sizes of protection.

What follows are examples of basic gear-racking options:

- Padded gear sling
- Carabiners (the number varies, depending on the type of climb and the route)
  10 Ovals
  10 D's
  2 or 3 Large Steel for anchorage
- No. 3, 4 HB Brass Offset Nuts
- No. 4-9 Black Diamond Stoppers
- No. 5-2 Camp Tri Cams
- No. 8-10 Black Diamond wired Hexentrics
- No. 2 Wild Country Forged Friend
- Nine feet of 5.5mm Spectra® cord
- Five 24" sewn runners
- Five 12" quickdraw runners
- Nut tool (chock pick)

Or you might choose these additions or variations:

- One full set of wired nuts or stoppers up to 3/4 inch wide
- 6-10 spring-loaded camming devices (Friends, Camalots, TCUs) from 3/8 to 3 inches
- Two cordelettes for belay anchors (cordelettes are 16-foot lengths of 6mm Spectra® cord, tied into extra-long runners with a triple fisherman's knot)
- Extra tied runners for rappel and other anchors
  Singles (5.5 feet each) in one color of 1 inch tubular webbing
  Doubles (9.5 feet each) in another color

What's the Right Amount of Gear?

The amount of gear you take depends a great deal on the climb itself. Before you go, read up or ask about the routes that you're planning to do. Rock climbing guidebooks frequently state the recommended chock or cam size, for example, "protection up to 2 inches." Knowing this, you can leave the unsuitable sizes of pro at home.

Climbing Gear Selection Essentials

If you're new to leading, chances are that you'll tend to "sew up" the route, placing more pieces than an experienced climber would. You may feel more comfortable having more gear on hand, as you learn to lead.

NOTE: Beginning climbers often rely on their more experienced climbing partners to supply certain pieces of gear, such as climbing ropes, carabiners, pro devices, belay devices and belay gloves. Borrowing such gear for your first several climbs can help you decide which products work best for you before you buy your own equipment.

Options for Organizing Your Rack

When climbers swing leads (take turns leading and following), they typically carry one gear rack and pass it back and forth at the end of each pitch or rope length. The gear needs to be easily accessible and arranged so as not to interfere with climbing. Agree with your climbing partner on a method of organization that works for both of you. In addition, consider getting an adjustable gear sling that can be resized quickly for a larger or smaller partner.

Here are some common ways to rack, or organize, your gear:

Group several similar-size wired chocks on one carabiner.
Positives
- Makes the rack smaller and lighter since fewer carabiners are used
- Less bulk on the rack means easier climbing

Negatives
- Makes placing protection more difficult
- Requires removing a chock from the carabiner and placing it with one hand without dropping the rest

Put one piece of pro on each carabiner.
Positives
- Placing pro is straightforward and fast. Select and clip without sorting through several sizes

Negatives
- Makes the rack heavier and bulkier with extra carabiners
- Leaves few carabiners free for clipping the rope or other uses

Put pro on harness gear loops.
Positives
- Lowers your center of gravity and reduces swinging of the gear sling

Negatives
- Can be more difficult to see and reach the gear on your sides and behind you than in front of you

Other Gear Strategies

Many climbers put larger camming devices and hexes toward the back of the gear sling and the smaller nuts and free carabiners toward the front.

- Attach cordelettes, extra runners, and your chock pick on the side gear loops of your harness.

Climbing Gear Selection Essentials

- Attach your belay device and belay gloves to the back of your harness.
- Buy each length runner in a different color for quick identification. For example, buy all 6-inch runners in red, 12-inch runners in green, and so on.
- Wear your runners over the opposite shoulder from your gear sling. Or chain the runners to shorten them and clip them to the harness gear loops.
- Separate the runners you wear over your shoulder by clipping a 'biner to each one. This helps keep them untangled so you can pull them off your shoulder one at a time as needed.
- Double up the longer runners and attach two carabiners to them. Clip one 'biner to your harness and let the other one hang. Make sure you've shortened the runners enough to keep them from interfering with your climbing.
- To prevent the loss of your chock pick, buy an inexpensive key chain with a plastic coil and clip. (These are available at most hardware and drug stores.) Attach the pick to the ring and clip the other end to your harness with a carabiner. When you need to use the pick, stretch out the plastic cord, keeping the other end attached to your harness.

Rock Climbing Glossary

A

Abseil—(pronounced AB-sail) To make a controlled descent on a fixed rope. The term is typically used in Europe and Australia. See **rappel.**

Accessory cord—Nylon, Kevlar® or Spectra® cord sold in a range of diameters, typically smaller than those of climbing ropes. Used for a variety of things including slings, anchors, prusiks, and emergency tie-offs. Accessory cord is static, or very low stretch.

ACD (Active Camming Device)—Protection device that secures in rock cracks or pockets by means of spring-loaded cams. See **SLCD.**

Active protection—Any piece of climbing protection that has moving parts, typically with springs. Examples include spring-loaded camming devices, sliding wedges and tube chocks.

Aid climbing—A type of climbing that makes use of rope, fixed bolts, pitons or foot slings, rather than features on the rock itself, to ascend the face. Opposite of free climbing.

Anchor—A point of attachment for a climbing rope, usually made with slings, runners or the rope itself. May be top-rope anchors, belay anchors or a protection piece mid-climb.

ANSI (American National Standards Institute)—Establishes and enforces industrial standards in the United States. See **CEN**.

Approach—The route or walk in to the base of a climb.

Ascender—Any mechanical device that slides upward when put on a fixed rope but catches when weight is put on it, allowing a climber to use the rope to move upward or to haul gear. Used in aid climbing, mountaineering rescue and caving.

ASTM (American Standards for Testing and Materials)—Establishes materials specifications and testing standards in the United States.

Auto-lock—Spring-loaded, twisting mechanism on a carabiner gate that locks by itself when the gate is closed.

B

Backup—Any additional protection that is added to provide redundancy to an anchor.

Barn door—To swing sideways out from the rock due to being off balance. Often occurs with a lie-back maneuver.

Bashies—Malleable anchors that are literally bashed into small cracks for use in aid climbing. Tough to remove.

Belay—To keep a climber from falling too far by using friction on the rope. The system that stops a climber's fall. It includes the rope, anchors, belay device and the belayer.

Belayer—The person who manages the rope so as to catch the climber on the other end in case of a fall or a slip.

Bent-gate carabiner—Sport-climbing carabiner used on the rope-clipping end of a quickdraw. The bent gate provides a larger opening than straight-gate carabiners provide for clipping in the rope.

Beta—Information about a climb. "Running beta" is information given while the climb is being executed.

Bight—A bend in a rope or a folded section of rope.

Big wall—Extended, multi-pitch rock climb that often takes several days to complete.

Climbing Gear Selection Essentials

Biner—Short for "carabiner".

Biomechanics—The study of the mechanics of muscular activity.

Bivouac—A usually temporary encampment under little or no shelter. In terms of climbing, an overnight stay on a wall during a multi-day climb, or sleeping without a tent in a bivy sack during a climb.

Bivy—Short for bivouac.

Board-lasted—Shoe construction in which the upper is attached to a stiff insole (also called the board). In board lasting, the insole is fixed to the last/form, then the upper of the shoe is wrapped around this assembly. In the final step the midsole, rands and finally the outsole are attached to the shoe.

Body belay—Belay technique using friction of the rope passing around the belayer's body to slow and hold a fall. It is often painful for the belayer and not effective in every situation, but can be used in emergency situations if no belay device is available.

Bolted route—A route protected with pre-placed bolt anchors rather than removable protection pieces. A sport route.

Bolts—Metal expansion bolts drilled into the rock for use as protection on sport or aid climbs. Hangers are attached to the bolts for clipping in your rope.

Bombproof—A hold or anchor that is thought to offer the utmost security; for example, a top-rope anchor around a large, stable tree trunk or immovable boulder.

Bottleneck—A crack with converging sides. Good for placing tapers or other passive protection.

Bouldering—Climbing close to the ground without the use of a rope. Typically used for practicing traverses, weight transfers, and foot and hand placements. Can be done on boulders or at the base of a rock face.

Bowline —(pronounced BO-lin) A knot frequently used for tying the middle climber onto a glacier rope team, among other uses.

C

Camalot™—Spring-loaded camming device made by Black Diamond. See **SLCD**.

Camming—The act of rotating into place until wedged or tight.

Camming device—A piece of climbing protection that wedges into a crack or pocket by rotating. Can be a passive cam or a spring-loaded device with two or more camming pieces on a stem.

Cambered sole—A curved or arched sole with a down-turned toe. Found on rock climbing shoes for more advanced climbers. Focuses foot position over the toes for more precise placements.

Carabiner—Metal loop (usually aluminum) with a spring-loaded gate on one side used for connecting various parts of a climbing system. May be oval, pear- or D-shaped. Also "karabiner", " 'biner" or "krab".

Caving—The sport of cave exploration using many of the same techniques and gear as climbing.

CEN (European Committee for Standardization)—Establishes the minimum safety requirements for climbing gear. The organization's stamp ("CE") must appear on all climbing gear sold in Europe. See **ANSI**.

Chalk—Carbonate of magnesium, or gymnasts' chalk, used to keep a climber's hands dry for better grip.

Chalk bag—Small pouch, usually with a drawstring closure, worn on the harness to hold climbers' chalk.

Chest harness—A harness used in conjunction with a seat harness to keep the body upright in case of a free fall

(into a crevasse, for instance). Also supports the body when rappelling with a heavy pack.

Chimney—Wide, vertical crack large enough for a climber to fit inside and climb. A move done inside the chimney by using opposing force with the feet and the body.

Chock—Universal term applied to passive protection piece wedged into cracks for use as a rope anchor during a climb.

Chock pick—See **nut tool**.

Chockstone—Rock or stone tightly wedged in a crack. Originally used for climbing protection by girth-hitching a runner around it and clipping the rope in. Precursors to metal chocks.

Clean—A route that is free of vegetation and loose rock. Also, to remove protection as you second, or follow, a lead climber.

Climber—Anyone who participates in the sport of climbing. Also refers to the person moving (as opposed to the belayer).

Climbing—Movement upward on rock, snow, ice, or a mixture thereof.

Clove hitch—A knot used for tying the climbing rope to an anchor, as when setting up to belay the next climber.

Cordage—Static cord used for different climbing applications. See **Accessory cord**.

Cordelette—A long (typically 16-foot) section of 6mm Spectra® cord tied into a multi-purpose anchor sling. The cordelette is useful for making three-point, equalized anchors.

Core—The center fibers of a climbing rope. See **sheath**.

Crab—Slang for a carabiner.

Crack—A fissure in a rock wall, typically used for hand- and footholds while climbing. Can be paper-thin to larger than body size.

Crag—A small cliff, or the term for a climbing area.

Crux—The toughest move or sequence of moves on a climb.

D

Daisy chain—Runner with multiple loops for use as an adjustable anchor. Often used by aid climbers.

Dihedral—Two planes (of a rock face) that intersect. An inside corner in which a climber can use counter-pressure on each side to climb it. Also referred to as an "open book".

Double runner—A 9.5-foot length of tubular webbing tied into a loop with a water knot used for attaching pro to the climbing rope or creating anchors. Must be doubled over to be worn over one shoulder on most people. See **single runner** and **triple runners**.

Drag—Friction created when a climbing rope passes through multiple pieces of protection, especially if they are not in a straight line up the route. Can pull a lead climber off balance.

Dry-treated—Ropes that have been coated with or immersed in a water-repellent chemical. Helps maintain the life of the rope by keeping it clean and resisting abrasion. Keeps ropes from becoming heavy and unmanageable when used on ice and snow.

Duodess—Trade name for different colors and patterns on each half of a climbing rope. Used for locating the center quickly. Also called "bicolor".

Dynamic—Climbing rope that elongates or stretches to absorb the impact of a fall. Opposite of static. Also, a climbing move in which the climber lunges or leaps to the next hold. Also called a "dyno move".

E

Edging—Standing on small ledges or crystals with the edges of climbing shoes rather than the soles.

EN (European Norm)—Designation given to products that meet CEN standards.

F

Face—The relatively smooth portion of a cliff. A face climb typically requires friction and various handholds, whereas a crack climb uses more counter-force and jamming techniques.

Figure 8—Climbing knot woven in the shape of the number 8, typically used for tying the climbing rope to the climber's harness. Also, the name of a belay/rappel device with the same shape.

Fisherman's knot—Knot used for attaching 2 ends of accessory cord or rope together. Can be double or triple (have 2 or 3 wraps), depending on the type of material used.

Flared—Describes a crack with nonparallel sides that diverge upward or inward.

Flash—A red point ascent (first try on lead) utilizing prior inspection, information or beta from others.

Follow—To be the second up a climb. In traditional climbing, to remove and collect the protection that the lead climber has placed. See **second**.

Free climb—To climb using only hands and feet on the rock. Rope is used only for safety and is not relied upon for upward progress. Opposite of an aid climb.

Free rappel—A controlled descent on a rope in which the climber is not in contact with the rock. A free-hanging descent. See **rappel**.

Free solo—Climbing without a belay, which is usually very high risk. Unlike bouldering, free soloing goes far above the ground on full-length routes.

Friction—A style of climbing that involves few positive holds and relies on balance, footwork and weight over the feet for grip on the rock face. Friction of climbing shoes is also used.

Friend—The first successful spring-loaded camming device, made by Wild Country. Also the generic term used for spring-loaded camming devices. See **SLCD**.

G

Gate—Spring-loaded opening on a carabiner. Can be straight or bent, locking or nonlocking.

Gemini2 cord—Black Diamond's brand of Technora® aramid fiber cord with characteristics similar to Kevlar® but with different physical properties.

Girth hitch—A simple knot made with a runner or sling by wrapping it around a fixed object and looping it through itself.

Grigri—The first popular belay device with an auto-locking mechanism to catch a climber's fall. Made by Petzl.

Gripped—To be paralyzed by fear or confusion.

Gym—Indoor climbing facility. Inhabited by gym rats, or climbers who spend all their time on artificial walls.

H

Half rope—Rope of a small enough diameter that it must be used in pairs, each one being clipped into alternate

pieces of protection, 8.2 to 9mm in diameter. See **single rope** and **twin rope**.

Hang dog—To rest on the rope as you lead climb, putting weight on the protection rather than the rock.

Hanging belay—To belay facing the wall while suspended by your harness to anchors. Hanging belays are done when there is no suitable ledge or foothold available. Most often done on difficult, multi-pitch climbs.

Harness—A webbing belt and leg-loop system that attaches a climber to a rope. Usually a seat harness for rock climbing. Full-body harnesses are used for rescue and for children. Chest harnesses are used with seat harnesses, usually for glacier travel.

Hexentric—Black Diamond's name for 6-sided passive protection that either wedges or rotates into place in a crack. Original "hexes" are threaded onto 5.5mm cord. New hexes come with wires.

J

Jam—To wedge a body part into a crack on a rock climb in order to put weight on it and move upward. Includes fingers, hands and feet.

Jug—Large, easily gripped hold. Also, to climb up a fixed rope using an ascender.

Jumar—The original mechanical ascender, often applied to all brands of ascenders. Also the term for using an ascender.

K

Kernmantle—Nylon climbing rope construction consisting of a core (kern) covered by a braided outer sheath (mantle).

Kevlar®—Strong, light fiber made by DuPont used in bulletproof vests. Used in climbing cord for its high tensile strength and resistance to cutting.

Kilonewton (kN)—A measure of force equal to 224.8 lbs. A "newton" equals the force required to make a 1 kilogram mass accelerate at a rate of 1 meter per second per second. Climbing gear is rated in kN to show how much falling force it can hold.

L

Last—The 3-dimensional form on which a shoe is constructed.

Lead—To be the first person on a climb, either clipping the rope into bolts or placing protection as you go. Belayed by the second, below you.

Leg loops—The part of a climbing harness that goes around the upper legs of the climber and provides support. Typically attached to the waistbelt, although some waistbelts and leg loops are sold separately for a more customized fit.

Lie-back—Climbing technique that uses counter-pressure of hands pulling and feet pushing, typically to climb an offset crack or a flake. The term "lie-back refers" to the body position of leaning backwards and to one side with arms straight and feet shuffling up the wall.

Lower—The way in which a belayer brings a climber down from a climb (as in after a fall or repeated attempts) by slowly letting rope out through the belay device. More often done during gym or sport climbing than in traditional outdoor climbing.

M

Mantel—A climbing move in which downward pressure is applied with the hands to a ledge, lifting the body high enough to get the feet on that same ledge. Usually used when no handholds are available.

Multi-pitch—A climb longer than one rope length. See **pitch**.

Munter hitch—A friction knot, typically tied to a large carabiner, which can be used to belay a climber. Good to know in case you lose your belay device.

N

NFPA (National Fire Protection Association)—Sets standards for rescue equipment, including static ropes.

Nut—Passive protection piece consisting of a wedge-shaped piece of metal affixed to a wire. Originally modeled after railway nuts. See **chock**.

Nut tool—A small, hooked pick used to remove protection when seconding (following) up a climb. Used on passive and active protection pieces. Also called a chock pick.

O

Off-width—A crack that is wider than a hand or foot but too narrow for a climber to chimney (fit the whole body) in. Generally 4-10 inches.

On sight—To lead a climb on the first attempt without prior knowledge of the route or moves. Applies to difficult climbs.

On-sight difficulty—The test, in a competition, of how far a climber can progress on a wall with no prior knowledge of the climb.

OSHA (Occupational Safety & Health Administration)—US government agency that sets and enforces safety standards in the workplace.

P

Passive protection—Any piece of climbing protection that does not have moving parts. Examples include chocks, stoppers, nuts or any other wedge-shaped pieces that fit into cracks, as well as hexentrics and tricams that are rotated to fit tightly into cracks and holes.

PCD (passive camming device)—A piece of protection without moving parts, such as a hex or a nut. Opposite of **ACD**.

Perlon—European term for nylon. Often used as a term for nylon accessory cord, as in 6mm perlon.

Pitch—The length of a climb that can be protected by 1 rope length. A pitch is led by the lead climber and cleaned by the second (or follower). See **multi-pitch**.

Piton—A thin, wedge like piece of metal that is pounded into a rock face and then clipped to the climbing rope for protection. The original means of protecting climbs, now out of favor because of the damage it does to the rock.

Placement—An opening in the rock in which a piece of protection fits. Also the act of inserting a piece of protection.

Protection—Any device used to secure a climbing rope to rock, snow or ice to prevent a climber from falling any significant distance.

Prusik—The sliding friction knot developed by Karl Prusik. Made by wrapping a loop of small-diameter cord around a larger-diameter rope. The loop slides when loosened but holds by means of friction when weighted. Used for ascending fixed ropes and for rescue situations to tie off the climbing rope. Also refers to the act of ascending a fixed rope with prusik loops.

Pumped—To be weakened or in pain (usually in the forearms) from a strenuous move or climb.

Q

Quickdraw—A short runner used to attach a rope to a bolted anchor with carabiners.

Quickdraw set—A quickdraw sold with carabiners attached.

Climbing Gear Selection Essentials

R

Rack—The selection of gear used for a climb. Also refers to a sling full of this gear.

Rand—A rubber strip running around the edge of a shoe where the upper meets the sole. On climbing shoes, the portion that does much of the gripping on the toes and heels.

Rappel—To descend a cliff or other height by lowering oneself on a fixed rope, with feet against the wall. Friction is placed on the rope, usually with a belay device, to keep the descent slow and controlled. See **free rappel**.

Ratings—Numerical (and sometimes letter) value given to a rock climb to reflect its relative difficulty.

Red point—To lead a climb without falling or putting weight on the rope, regardless of number of attempts. Applies to difficult climbs.

Redundant—Having more than one anchor. To have backup anchors, in case one or more anchors fail.

Retire—To stop using a piece of climbing gear (for climbing) due to age or damage.

Ring bend—A knot used to tie nylon webbing. More commonly called a "water knot".

Route—The path or moves up a specific climb.

Runner—Loop of nylon webbing used to attach the climbing rope to protection or to make anchors. Can be tied (homemade) or sewn (bar-tacked commercially).

Runout—The distance between a climber and his or her last piece of protection. A long runout equates to a long fall. In alpine climbing, it's the area below a climbing route onto which a climber would land if he or she were to fall. Look for a safe runout on a snow slope before glissading.

S

Screamer—A long fall on a rope, frequently with screaming. Also the model name of an energy-absorbing runner made by Yates.

Screwlock—Threaded collar that locks a carabiner gate when it is screwed down.

Second—To follow or be the second climber on a rope team.

Semi-flexed—The sole configuration on some climbing shoes that mimics the natural flex of the foot.

Sewing-machine leg—Uncontrollable shaking of the lower leg(s) caused by fatigue and/or fear while climbing. Resembles the up-and-down movement of sewing-machine parts.

Sheath—The woven outer cover on a climbing rope or accessory cordage.

Single rope—A rope whose diameter is large enough to support a leader fall when used singly. Typical diameter is 9.8mm-11mm. See **half rope** and **twin rope**.

Single runner—A 5.5-foot length of webbing tied into a loop with a water knot, used for attaching pro to the climbing rope or for creating anchors. Fits most people comfortably worn over one shoulder when climbing. See **double runner** and **triple runner**.

SLCD (Spring-loaded camming device)—A piece of active climbing protection composed of a number of cams on a stem with a trigger bar. When the bar is pulled back, the cams compress to a size small enough to fit inside a crack or pocket. When the bar is released, the cams flare outward and rotate/wedge into place, providing protection. The rope is then clipped with a runner to this piece of protection. See **Friend, Camalot, TCU**.

Slingshot rand—Internationally patented by La Sportiva, this one-piece rubber rand wraps around the entire foot, preventing stretch and driving the foot forward for a powerful forefoot fit.

Slip-lasted—The method of footwear construction in which the upper is sewn into a sock and then slipped onto the last. Slip-lasted shoes normally do not have an insole and get their "stiffness" from the midsole, which is located just above the outsole. Slip-lasted rock climbing shoes tend to be sensitive and less stiff than board-lasted shoes.

Slipper—A snug-fitting sport climbing shoe that is slipped on rather than laced. Popular for gym climbing and bouldering.

Smear—Climbing technique in which the sole of the shoe, plus proper weight over the feet, provides traction for moving upward.

Snaplink—Name for carabiner, popular in the military.

Solo—To climb alone without protection.

Spec—Meeting specifications.

Spectra®—A molecular-weight polyethylene developed by Allied-Signal. The strongest fiber ever produced, it is 10 times stronger than steel by weight and twice as strong as Kevlar®.

Speed climbing—A competition that tests how far a climber can progress in a given time or how long it takes to complete a given climb.

Sport climbing—Rock climbing using pre-placed protection such as bolts or a top rope. Frequently involves difficult, gymnastic moves. Opposite of traditional climbing.

SRENE—Acronym for Solid, Redundant, Equalized and No Extension, which refers to the qualities of a good climbing anchor.

Static—Limited movement or stretch, when referring to a climbing rope. Static ropes are used for rescue, caving and rappelling, but do not stretch enough to absorb the impact of a leader fall when climbing. Opposite of dynamic.

Stemming—Technique in which the hands and/or feet are pressed in opposition far out to each side, as in a dihedral or wide chimney.

Sticht plate—Original friction device for belaying developed by Franz Sticht. Consists of a plate with 2 holes and sometimes a spring on the bottom. A bight of rope is passed through one of the holes and locked to the belayer's harness. The plate provides friction on the rope to slow or stop it. The spring keeps the rope from getting wedged in the plate's holes. (Both holes are used only when twin/double ropes are being used.)

Stopper—See **taper, nut or chock**.

Swami—Traditional climbing harness made by wrapping webbing around the waist. Also refers to the waist-belt portion of a climbing harness, sometimes sold separately from the leg loops for a custom fit.

T

Taper—Passive protection with one end wider than the other, so that it wedges into cracks. See **chocks, nuts**.

TCU (three-cam unit)—Spring-loaded camming device by Metolius with 3 moving cams. See **SLCD**.

TDR (thermodynamic rubber)—A synthetic rubber commonly used to create sticky soles on climbing shoes.

Three-point suspension—The principle of moving only one hand or foot at a time, leaving the other three on the rock for balance, as in a tripod.

Three-sigma rating system—A method of statistical quality control (SQC) used to describe, analyze and control the rated strengths of climbing gear.

Toe displacement—The degree to which a climbing shoe curves the foot toward the inside edge, determined by the shoe's sole shape.

Top rope—A rope that is passed through a fixed anchor at the top of a climbing wall or cliff, with each end tied to the climber and the belayer at the bottom. A top rope (with a watchful belayer) ensures that the climber is always protected from falling very far, and is thus a good way to learn to climb. "Top-roping" is the term for this type of climbing.

Traditional or "trad"—Rock climbing using protection placed by the lead climber and removed by the second, as opposed to sport climbing, in which protection (bolts) is pre-placed. See **sport climbing**.

Triple runner—A 14-foot length of webbing tied into a loop with a water knot, used for attaching pro to the climbing rope, but more often for creating anchors. Usually must be wrapped three times to be carried over one shoulder of the climber.

Tube chock—Cylindrical, spring-loaded protection. Made of telescoping aluminum tubes that expand and wedge in place. Typically used in very wide, vertical cracks and in holes where other protection will not fit.

Twin rope—Climbing rope designed to be used in pairs with both strands running parallel through the same protection. Thinner in diameter than single rope. See **half rope** and **single rope**.

U

UIAA (Union Internationale des Associations d'Alpinisme)—International climbing association founded in 1928 to ensure the safety of climbing equipment and to oversee the sport of climbing.

Undercling—A climbing move in which counter-pressure is applied to the underside of a rock flake or slab by pulling up on it, while pushing down on the feet.

W

Water knot—Knot used to tie two ends of flat webbing together. Also known as a "ring bend".

Webbing—Woven nylon tape used for making slings and runners for climbing.

Wedge—A tapered protection piece that is wedged into place in a crack. See **taper**.

Whipper—A long fall.

Wire—Metal cable at the end of a nut or chock that allows a carabiner to be attached.

Z

Zipper—A series of protection placements that pop out in sequence when the leader falls. Often coincides with a **screamer**.