CLIMBING ROPES

Construction

Modern ropes use a kernmantle (sheath and core) type of construction, where the inner core contains braided load-bearing fibers running the whole length of the rope with no joins. The sheath is largely for protection of the inner core, but it does contribute significantly (10–25 percent) to the strength of the rope.

Dynamic climbing ropes can stretch to absorb energy when a leader falls. This elasticity plays a vital role in reducing the forces exerted on the climber's body and the anchors, known collectively as the "safety chain." For nonleading situations such as rappelling, prusiking or top-roping, a low-stretch "semi-static" rope may be more appropriate as the rope will not be needed to absorb as much energy.

Rope sizes

Dynamic rope specifications describe the configuration with which the rope is designed to be used. Single ropes can be used alone and are tested as a single rope with multiple leader falls. These ropes are popular for sport climbing and also for either single-pitch climbs or longer routes with pitches that do not zigzag too much. Single ropes average between 9.5 mm and 11 mm in diameter. For longer routes, a second rope for use on rappels is often used—it is often much thinner (6–8 mm). These second lines are referred to as haul lines or tag lines. Twin ropes are intended for both ropes to be clipped into every protection point when leading, but allow full pitch-length rappels when connected together for descent. These ropes can be very thin—usually somewhere around 8 mm in diameter. Due to the high impact force and high elasticity, twin-rope systems are rare outside the European Alpine regions. The ropes of choice for complex traditional climbs are double (or "half") ropes. These can be clipped into alternating anchors and are strong enough individually to hold leader falls, although a long leader fall from above a belay to below it would severely test this type of rope (see *Constructing Safe Belays* on page 58). Half ropes average about 9 mm in diameter.

Care and storage

Climbing ropes should be protected from corrosive chemicals and should be washed after contact with sea water or after use in gritty or muddy conditions; this prevents salt crystals from causing internal damage or dirt from spoiling the rope's handling qualities. Dry the rope thoroughly, then store it away from direct sunlight, heat sources or potential contaminants.

When handling a rope, check its feel and appearance for any signs of damage such as distorted sections or a visible core. Downgrade the rope to top-rope or rappel if it is subjected to big impact falls or shows signs of any minor damage. Significant furring of the sheath is an indication that many outer fibers have been damaged, whereas a smooth, "glassy" scar running along a section of the rope is a clear sign of friction damage. Ropes marked in this way are suspect—there is no way of telling what has happened to the core.

Lifespan

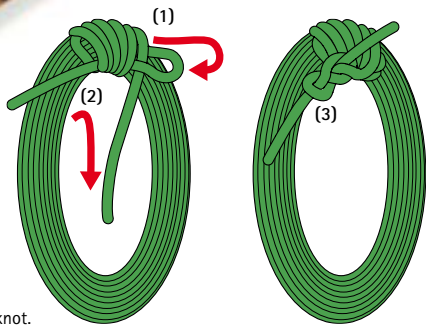
This depends on how much the rope is used. With frequent but careful outdoor use, a climbing rope should last at least a year. With infrequent or indoor use, a rope may last much longer—follow the manufacturer's guidelines.

Slings/runners (webbing)

Normally factory-sewn in various lengths, slings are made either entirely from nylon or mixed with white strands of exceptionally strong polyethylene to produce Dyneema or Spectra slings. The two main lengths for slings are 24 in (60 cm) or 48 in (120 cm), which can be conveniently carried over one shoulder. The greater strength of Dyneema allows thinner and lighter slings, but these are more prone to heat damage and the ends should be stitched together rather than knotted.

TIP

A badly damaged rope is best cut through completely to prevent accidental use in the future.



There are several ways to **coil a rope**. This approach allows the rope to be carried over one shoulder. (1) Tuck one end back on itself to make a loop. (2) Wrap the other end tightly around. (3) Finished rope coil with optional final locking knot.

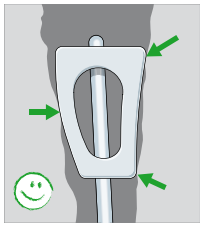
PLACING AND REMOVING PROTECTION 2

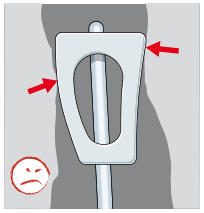
Nuts and cams

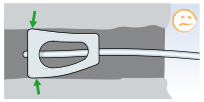
Most leaders prefer to keep their wires racked in two or three bundles of similar sizes (i.e., small, medium and large) so that several can be tested in a placement if necessary before removing the carabiner holding the rest of the bundle. The choice is between carrying equipment on a bandolier (or gear sling) or gear loops on the harness. Having quickdraws on a bandolier, with nuts and cams on the harness, is probably the best combination.

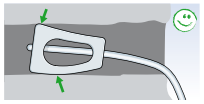
A perfect nut placement is keyhole-shaped: The nut slots in at the top, wider end, and is fed by gravity into the smaller crack where it cannot fall out. For less than ideal cracks, try to get as much metal in contact with rock as possible. Get in the habit of rating placement reliability to aid your risk assessment when psyching for a move.

All wires and roped nuts can be turned sideways to fit a larger crack. This is usually much less desirable than placing a larger piece of equipment, but if you are running out of equipment, it can expand your choices.



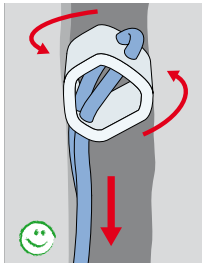


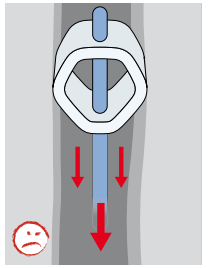


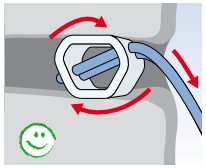


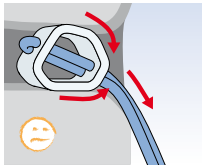
Left: **A secure nut placement** has plenty of metal in contact with the rock and the crack tapers downward. In horizontal cracks a curved back allows a camming effect as shown here.

Below: Using a nut tool to **remove a stuck wire**.









Secure hexcentric placements: Pulling the cord rotates and cams it more securely. Insecure placements: The hex is pulled downward or sideways without a camming effect.

An assortment of wires and hexes: Store several sizes on one carabiner to allow an efficient choice of placements by releasing just the one carabiner.

A rack of cams: For crack climbing you may need several of the same size.

Shallow cracks, or gaps between protrusions, may only accept a sideways placement—this is better than leaving half the nut hanging in space. For harder routes carry a few tiny brass wedges (e.g., RPs) for shallow placements.

Removing nut protection

This is something of an art. Often a hard flick of an attached quickdraw upward or sideways to where the crack widens will release them. Wires that are too well seated for this method may respond to a tap with the carabiner, or may require hard prods with a nut tool—try a similar tactic for jammed hexes. Failing that, a sequence of tapping and hooking may be needed. For these really stubborn placements it may be possible to clip your harness into a higher protection point or just hang on the rope to free both hands.

Camming devices

Spring-loaded camming devices are ideal for utilizing parallel-sided cracks, and an ever-increasing range of sizes is available. Make sure your partner is equally skilled at removing them, as they are expensive and unsightly to leave behind. Most modern camming devices have flexible shafts—particularly useful for placements in horizontal cracks, as the old rigid shafts have been known to bend and eventually break when loaded if much of the shaft protrudes beyond the rock.

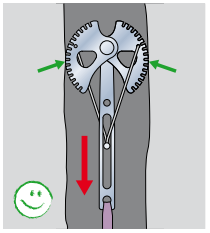
Camming devices hold best far outside the extremes of their range of movement. Over-cammed devices are more likely to fail when loaded but, ironically, are usually harder to remove by the second climber.

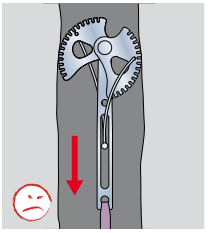
Camming devices are particularly liable to being pulled out of their intended orientation; in other words, to movement. If the device is repeatedly loaded, rotated and unloaded, it tends to creep or "walk" into or up the crack, where it may become useless if the crack widens out.

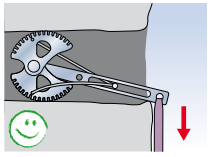
Jammed cams are particularly unsightly and costly. Resist the temptation to damage the rock, no matter how expensive the device. To remove them, both triggers need to be pulled while the shaft is simultaneously pushed, and stubborn placements might need alternate movements of the triggers. Some nut tools have a double hook that can pull both triggers if the cam is too far into the crack for fingers to reach. Sometimes a hard tap on the shaft linked to a steady pull on the triggers can persuade the cam to release.

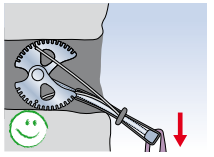
TIP

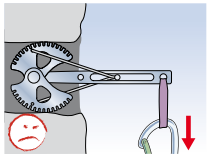
If there is a choice, avoid placements that have neighboring widenings in the crack where the cam could shift to. It is a good idea to add extenders routinely to cams to reduce this tendency.











Both sides of a **camming unit** should be loaded symmetrically. In shallow pockets a flexible stem is stronger due to leverage.

YOSEMITE, U.S.

Perhaps the greatest rock-climbing playground in the world, this magnificent park has traditional granite climbs to suit all tastes except beginners'. Yosemite is incomparably beautiful; it is one of the natural wonders of the world, a verdant valley rimmed by 3,000-ft (925-m) rock walls. The style of climbing is characterized by sustained cracks and often run-out slabs, but there are also great opportunities for world-class bouldering.

Getting there

Yosemite National Park is located 200 miles (330 km) east of San Francisco. The most convenient major international airports are Oakland or San Francisco. From either airport a rental car can reach "The Valley" in four to five hours via Highway 120. The journey is possible by public transportation but takes a full day.

When to go

Yosemite is renowned for excellent weather. Because of the wide range of elevations and orientations, good climbing temperatures can be found somewhere throughout the year. Summer cragging is usually uncomfortably hot, but nearby Tuolumne is cooler. Spring and fall are the best times for most routes, and the tail end of the high season (early September) usually gives quiet conditions for a short visit (there are restrictions to prevent permanent residency). Winter can often be too wild and snowy to climb, and storms in late fall can also be dangerously fierce so check the weather forecast before you travel.

Where to stay

Most climbers camp: there is no budget hotel or motel accommodation inside the valley. The famous Camp 4 (Sunnyside Campground) is Yosemite's only walk-in campsite, but each plot is filled until it has six people and there are restrictions on how long you can stay (only a week in high season). For more comfort,

The magnificent bastion of **El Capitan**. The Nose route approximates to the line between light and shade.

and cost, there is the Pines campsite, or there are permanent tents in Curry Village. There is a daily fee for park visitors, and you should follow recommended precautions for storing food safely away from bears. Although there is no town in the valley there are full facilities—a supermarket, cafés and restaurants, plus an excellent climbing equipment shop and medical facilities. Free shuttle buses operate within much of the valley.

What to take

You will require a full trad rack of nuts and slings. Take a double set of cams and throw in one or two larger items as well. Some classic big-walls such as The Nose are climbed hammerless and have adequate bivouac ledges, but most other walls require much more equipment, including pitons, a hammer and portaledges. These massive walls should be attempted only by experienced climbers.

Guidebooks

McNamara, Chris and Sloan, Erik. *Yosemite Big Walls*. South Lake Tahoe: Supertopo, 2005.

Reid, Don. *Yosemite Climbs: Free Climbs*. Guilford: Falcon, 1994.

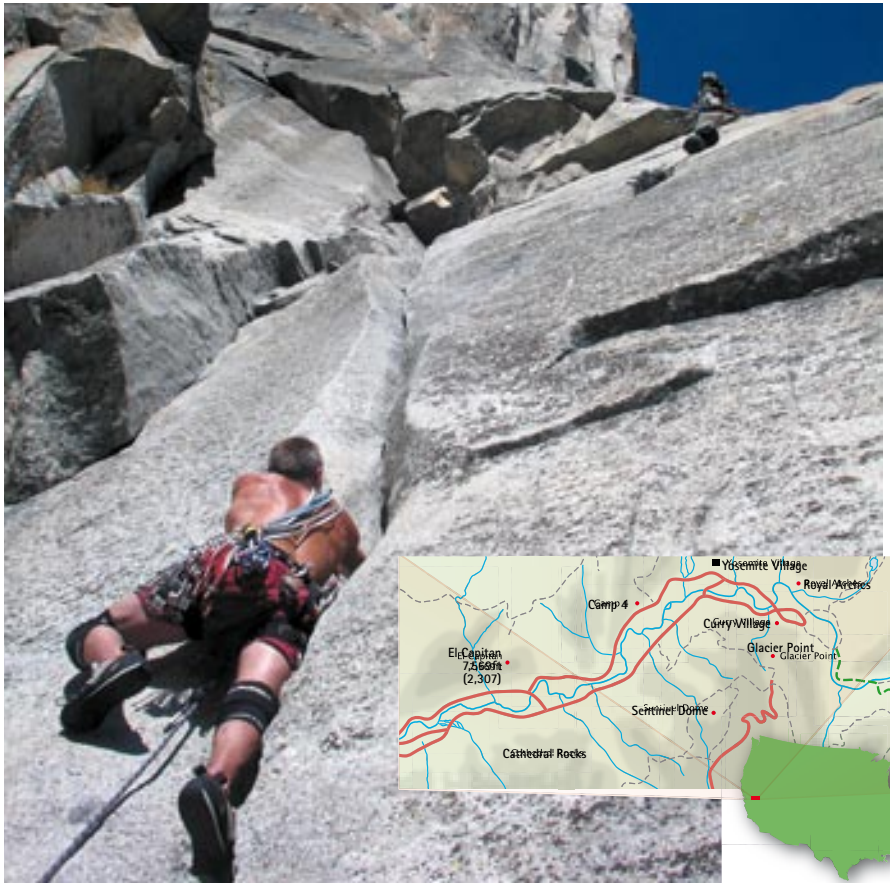
—. *Yosemite's Select*, Guilford: Chockstone, 1993.

Internet

There are numerous websites but perhaps the most general one is: www.yosemite.national-park.com.

CLASSIC ROUTES

Climb	Grade	Location
Short routes		
La Cosita Left Side	5.7	El Capitan
Bishop's Terrace	5.8	Church Bowl
Lunatic Fringe	5.10c	Reed's Pinnacle
Outer Limits	5.10c	Cookie Cliff
New Dimensions	5.11a	Arch Rock
Longer routes		
Nutcracker	5.8	Manure Pile Buttress
Snake Dike	5.7R	Half Dome
Serenity Crack/ Sons of Yesterday	5.10d	Royal Arches area
East Buttress	5.10b	El Capitan
North Face Route	5.11c	The Rostrum
Astro Man	5.11c	Washington Column
Big-wall routes		
The Nose	5.9, A2 or 5.13c	El Capitan
Salathé Wall	5.9, A2 or 5.13b	El Capitan
North West Face	5.9, A1 or 5.12	Half Dome



Setting off on one of the world's finest big-wall climbs, **Salathé Wall**, with more than 30 pitches ahead.