

Protection in Traditional Rock Climbing

Introduction

In the extreme sport of rock climbing there are many disciplines. The typical, although not required, progression that a typical climber goes through is to start with either bouldering or top-rope climbing and then move on to sport climbing and then eventually to traditional climbing. Traditional rock climbing is what was used by the original Stone Masters (the group of men who pioneered rock climbing in Yosemite and helped develop it into the multidisciplinary sport that it is today). This paper is intended for those who are interested in learning the basics of traditional climbing. Some of the language requires a basic background in the names of rock climbing equipment or gear.

The Basic Idea

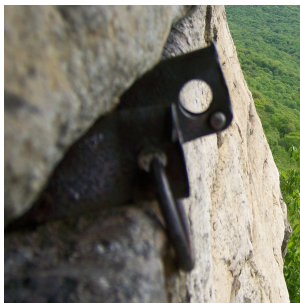
Unlike most rock climbing that you would see in a gym, the way this would work is by tying the rope to the harness of the climber and having them start from the ground and work their way up. As the climber went higher they would have to find ways to protect themselves, namely by hooking or strapping the rope to an anchor that they either fashioned from their surrounding or that they brought with them. These anchors make up the basis for creating a system of protection in traditional rock climbing.

The Anchors

There are three main types of anchors that will be discussed in this paper. These are pitons, nuts, and camming devices. There are many more that exist however, with the exception of pitons, these are the most prevalent in the modern world of rock climbing. Pitons are being included in this because they were the forerunner to all of the modern anchors that we use today.

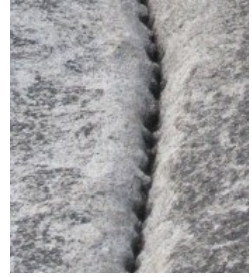
Pitons

A piton is simply a rod of a malleable metal, similar in shape to a railroad spike, that is pounded into a constriction in a rock face using a hammer, forcing it to take the shape of the constriction. These were some of the earliest forms of protection used in traditional rock climbing. The metals used range from harder metals such as iron to softer metals like brass. At the end of the piton is a loop through which the climber could hang a carabiner (a metal loop with a spring-loaded gate). The carabiner would then be clipped to the rope, giving the climber an anchor point should they fall.



Determining which type of metal to use was a process of give and take. On one hand, the softer metals were lighter making them more appealing for big wall climbing (climbs that are much longer than your standard route and typically require multiple pitches to complete). On the other hand, the softer metals would often become wedged into the constriction and unable to be retrieved.

Pitons are now very rarely used. During the time of the Stone Masters a movement began to encourage climbers to leave no traces when they climbed. The use of pitons often left noticeable scars in the rock face (pictured clearly in the figure to the right) that many deemed unappealing. The scars would also alter the climb itself. Because of this, climbers have sought more passive forms of protection.



Nuts

Nuts are the most common form of passive protection that are currently used in traditional rock climbing. Originally they were actually extra hardware (i.e. nuts and bolts) that had cord or wire strung through them but they eventually evolved into their modern shapes (pictured to the right).



These are considered a passive form of protection because they do not do anything to alter the rock itself. Rather, they are shaped in a way that slides into the natural constrictions in the rock and lock themselves into place (as pictured to the left). The metal cable that passes through the nut ends in a loop through which a carabiner, typically wire-gated, is slung through. The rope is then attached to the carabiner.

Nuts come in various sizes and a climber often carries a full set to ensure that they will be able to find one that matches the needed constriction.

Camming Devices

Camming devices, or cams, are perhaps the most elaborate form of protection ever invented for this sport. They consist of multiple spring loaded lobes connected across a common axle. By pulling a trigger, the spring compresses and the lobes rotate along the axle. This allows the cam to be slipped into a constriction in the rock face. Releasing the trigger allows the lobes to relax, locking them against the walls of the constriction (shown in the figure to the bottom right).



These are a very impressive piece of equipment for the climber to have. However there can be a few downsides to using this type of anchor. The first deterrent one would encounter is the price. The purple cam pictured above is larger than most cams that the climber will use (a size 5) and is valued at \$110. In addition to this, there is a process called over-camming in which the lobes flex too far backward and cannot be moved forward again. This results in that cam being permanently stuck within the constriction, an obvious problem. The third problem isn't necessarily a problem as much as a good idea to keep in mind (particularly when climbing on sandstone and other



brittle sedimentary rocks). This is that the way a cam works is by absorbing the force of the fall (which is in the downward direction) and reflecting it laterally through the lobes of the cam. When it does this, the force being put into the rock wall is equal to twice the force of the initial fall. Most rock walls can handle this amount of forces however it is not uncommon for a piece of protection to blow out a section of the constriction.

URL of Pictures
(Ordered by appearance in document, sorted by sections)

Pitons

<http://shop.gear4rocks.com/images/uploads/s03.piton-v-145h.jpg> (piton)

http://upload.wikimedia.org/wikipedia/commons/d/db/Gunks_Traps_-_Pitons_on_Shockley's_Ceiling_-_1.jpg (piton in wall)

http://climbinghouse.com/wp-content/uploads/2011/05/IMG_8187-650x816.jpg (scarring)

Nuts

http://www.rockclimbing.com/images/gear/products/2/51352-large_work-Pacific_Wedgie_Nut_7_10026991_3.jpg (nut set)

http://upload.wikimedia.org/wikipedia/commons/d/db/Climbing_nut_in_use.jpg (red)

Camming Devices

<http://www.rei.com/media/ll/f0357f03-9b8b-44a7-b662-01c57ef4dba7.jpg> (purple)

http://tiger.towson.edu/~molsen1/project/cam_placement.jpg (blue)