SAFETY AND TECHNIQUES

Bunny Ears
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It's been a couple of years since I wrote about rigging. Since then, I have noticed a disturbing number of people who are rigging with the double figure-eight knot using out-of-date technology. Worse, many cavers who don’t know the knot at all are using other knots in very inefficient ways to try to fill the gap.

The Double Figure Eight Loop

The double figure eight, or “bunny ears” knot is one of the cleanest and easiest ways to rig a rope to two points. These points are usually bolts set into the wall or ceiling of a cave near a pit, but they could be trees, slings rigged around rocks, posts, or beams. It’s a good way to get more strength out of a marginal anchor and also to get some redundancy.

There is a staggering range of knot names, varying regionally, by organization or sport, and all changing over time. Industrial riggers call this knot the “bunny ears knot.”

European cavers know it as the “Y-Hang” knot. Clifford Ashley, in the knot “bible” The Ashley Book of Knots lists it as knot #1085, the Double Figure Eight Loop. For this article I’ll just use the shortened name “double figure eight.”

Tying the knot is best shown in person or with some animation. The best way to learn knots and rigging is at a class, under personal instruction. Knots and rigging is a good topic for your local grotto meeting. Also, I recommend viewing the “Animated Knots” web site at www.animatedknots.com (Ed: look under climbing knots, double figure eight).

The double figure eight loop can make it easy to rig a rope onto two anchor points to create an anchor system. Such a system has several desirable qualities. Let’s examine these qualities and see how the double figure eight stacks up.

Good Anchor Systems Explained

The best anchor system has these “Earnest” qualities:

- Equalized
- Angles are reasonable
- Redundant
- No Extension
- Strong
- Timely

Equalized, for our purposes, means that each anchor feels a reasonable share of the load.

Angles refers to the load-multiplying effect of the angles of the ears of the knot. If the anchors are close together then each loop shares nearly 50% of the force. On the other hand, if the anchors are far apart and the loops are tightly spread between them creating a large angle, the force is multiplied so that each anchor can easily see five or six times the force of the load.

Redundant means that if one anchor or any single element of the system should fail the other elements can be expected to hold the load.

No Extension is an important concept. If one anchor fails and the other is subjected to a shock load as the knot shifts then the whole anchor system if very likely to fail. Keith Schafer published the results of a thorough study in 1991 that brought to light the importance of this quality.

Strong is simple in principle. Industry guidelines say that an anchor is strong enough if it will support 5,000 pounds, or hold a 22 kiloNewton force. In the absence of a professional engineer’s opinion it is up to us as responsible cavers to judge the strength of each anchor we use.

Timely means that a good anchor system must be simple enough that it can be built in a reasonable time. Another benefit of this kind of simplicity is ease of inspection.

With these criteria in mind, let’s examine the double figure eight knot used as a two-point anchor, and then we will look at some of its complex variations.

![Double figure eight in use on 200-foot rappel in Little River Canyon, Alabama, USA](image)

Each loop is sharing a portion of the load, roughly equalized as we tensioned the knot. The angle between the loops is low—well below 90°—so each loop feels roughly 50% of the load. If either loop, either anchor, or either carabiner fails, the remaining parts will not be compromised. What’s more, the remaining anchor won’t receive a large shock load—no extension. This two-point anchor system is stronger than either bolt alone. Lastly, this knot is simple and elegant. It is economical in its use of gear, easily tied in a short amount of time and easy to inspect.

Complex, “Self-Equalizing” Variations

There have been many books, web sites and classes that recommended the use of the double figure eight as a “self-equalizing” or “load-sharing” knot when it was fitted with very long loops and extra carabiners. Since the early 1990s, however, this configuration...
time to determine the rope length that the drop requires and lowering only that much rope, saving the remainder at the top of the drop (see the article “Self Rescue...” NSS News xxx 2005.) This leftover rope is now perfectly positioned to become a “pigtail” (if it’s short) edge-attendant’s line or an extra rope for use on the drop if it’s long enough. Each tail has equal strength in this knot. Remember to tie “stop knots” in the ends of both “tail” ropes, especially if one of them doesn’t reach the bottom. I like to mark any rope used as a short pigtail, perhaps with a bandana tied to it or a knot in it near the edge.

**NOW YOU KNOW IT—CAVE IT!**

Now that you know this knot you have a powerful tool available to you. It’s up to you to practice it and to use it safely in the field. Please seek the advice of someone knowledgeable to help you to understand anything that isn’t clear about when or how to use this type of anchor system.

The field of anchor systems is broad and complex, but you can do an enormous amount of recreational caving with only a few simple tools. The best rigging is clean and simple to understand by everyone in the party. The double figure eight loop, or “bunny ears” knot is one of the tools that every vertical caver should know and favor.

Safe caving!

**BIBLIOGRAPHY**


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**Seeking Candidates for NSS Vice Presidents**

Are you a firm believer in the goals of the NSS? Do you have a desire to get involved with the Society at the national level? If so, you might be a potential candidate for a Society officer position.

At this month’s Florida NSS Convention, the Executive Vice President, Administrative Vice President and Operations Vice President will be elected to the Board for a one-year term. The officers are elected by the NSS directorate. The officers are tasked with the day-to-day operation and management of the Society and accomplish this through the various committees assigned to them. Descriptions of the officer’s department and committees are found on the NSS web page and in the _Members Manual_. See the NSS Executive Search page for up-to-date information.

Officers attend the three yearly Board of Governors meetings and two to three Executive Committee meetings. Officers can expect to devote several hours to the job each week.

Currently Gordon Birkhimer, the Executive Vice President, and Cheryl Jones, the Operations Vice President, will be stepping down from their positions. The Executive Search Committee is looking for candidates for all the VP positions including these open positions.

If you feel you have the experience and time to be an officer then I’d love to hear from you. Also, please feel free to contact me if you just want to ask some questions about being an officer. I can be reached at 703-573-1068, e-mail kdditi@amsat.org, or through the NSS Executive Search web page.

**Gary Moss**

Chairman, Executive Search Committee