

Bunny Ears

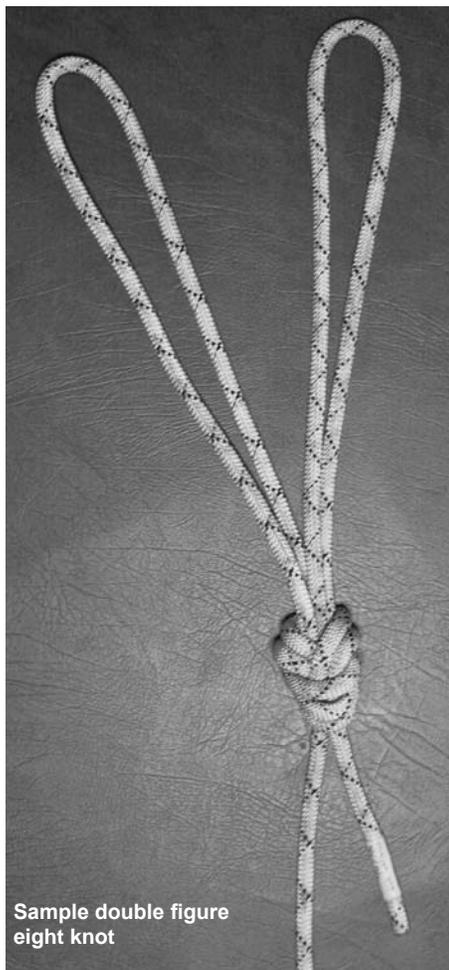
Clem Akins

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 Since then, I have noticed a disturbing number of people who are rigging with the double figure-eight knot using out-of-date technology.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."



Sample double figure eight 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 is 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 250-foot rappel in Little River Canyon, Alabama, USA

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



This self-equalizing variation is NOT recommended!

has been shown to work poorly at distributing the load. Not only that, it can be downright dangerous in the event of a failure of any single item of gear in the rigging!

This knot has several features that violate the principles of the EARNEST anchor. If the big loop fails, the entire anchor fails. If any carabiner fails, **or** one anchor fails, **or** the small loop fails then the system will receive a large shock load that is very likely to blow it apart. What's more, the friction of the rope across the many carabiners is so high that the load-sharing ability of this method is almost totally compromised.

While you will still find this kind of knot in books (even *On Rope*) and web sites, it no longer meets the criteria for a good multi-point anchor. In addition to being complicated and gear-intensive, the potential for shock-loading makes this anchor unsuited for use. There are many other better alternatives for an equalized anchor that are beyond the scope of this article such as a cordelette, a multi-sling anchor system, and using other combinations of knots for specific situations.

WHERE TO TIE IT?

Since the bunny ears knot is tied on a bight of rope, it lends itself to placement nearer the middle of the rope, rather than requiring a free end. This quality can be exploited to our advantage. It's worth the

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!

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ABOUT THE AUTHOR

Clem Akins lives in Chattanooga, TN, settling there to enjoy the outdoor life in the heart of TAG. He has been involved in caving and vertical rope work since the 1970s. He was an officer of the Chattanooga Grotto for 3 years, and has served on the Chattanooga/Hamilton County Rescue Service's Cave/Cliff team for more than 6 years. He currently works as a certified rope access technician and instructor.

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Gary Moss

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