Rope as a tool—as versatile as ever

By Jim Sullivan
(Drawings by Linda Parker)

Rope is one of our oldest and most useful tools and for those of us living in the backwoods, it is a relatively inexpensive tool, capable of making dozens of tasks easier and safer.

Types of rope material

Natural fiber ropes tend to be heavier, more subject to rot, and in the long run, less cost effective than synthetics. They also can't be stored wet.

But there are some occasions when natural fiber cordage and ropes are preferred. For example, when rope or cord must be abandoned in the field only natural fibers will biodegrade.

Today most rope and cord is made of four synthetic materials:

1. **Nylon**, which is strong, stretchy, and expensive.
2. **Dacron**, which is also strong and expensive, but doesn't stretch.
3. **Polypropylene**—frequently used as a utility rope. Although a lot stronger than any natural fiber, it is not as strong, elastic, or as pleasant to handle as nylon, but it is less expensive and it floats.
4. **Polyethelyne**, which is similar to polypropylene, but cheaper in every way—and harder to knot.

Rope performance, for both natural and synthetic materials, is also determined by the method of construction. Figure 1 illustrates three methods that I'll discuss: Traditional **three-strand twisted (or "laid" rope** is reasonably strong, spliceable, and inexpensive. It doesn't flatten under a load, so it's suitable for pulleys or winches. But it can rotate under a load.

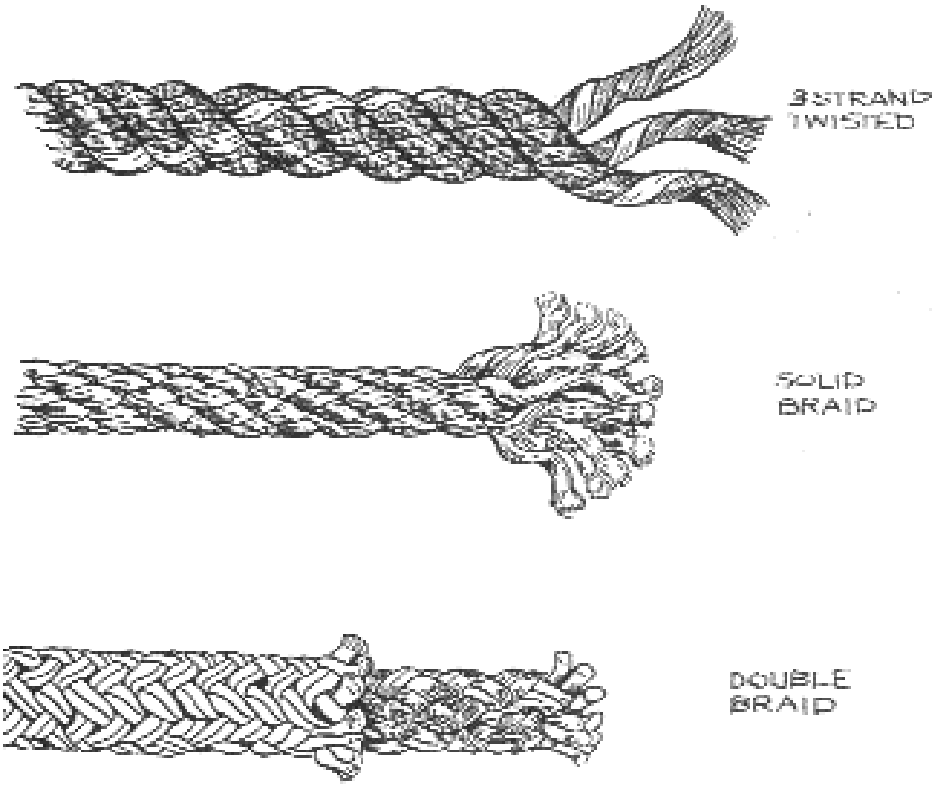

Figure 1. Rope construction methods.

Solid braid rope is not as strong as twisted rope, but wears better and has greater abrasion resistance. It handles well, doesn't flatten under a load and doesn't twist. But it isn't spliceable, and it is expensive.

Double braid rope is two ropes in one: usually a strong, abrasion-resistant jacket braided over a braided core. It doesn't flatten or rotate. It is flexible, spliceable (with a fid), attractive, strong, and very expensive.

Other construction methods are used for various specialty ropes. If you love that "natural feel," rope-makers can - for a price - combine the "feel" and knot-holding capacity of natural fibers with the durability and strength of synthetics. There are specially designed ropes for nearly every task you might imagine, from tree pruning to clothes drying.

The **Recommended Working Load (RWL)** is recorded on the package or spool label or in the manufacturer's catalog. You will note that the RWL is usually only 8 to 14 percent of the breaking strength for new twisted ropes and 15 to 20 percent for new braided ropes. The RWL may seem overly conservative to inexperienced workers, but several factors can combine to drastically weaken rope under a heavy load: To begin with, most traditional knots weaken rope by 60 to 90 percent (unlike splices, which are much stronger). Dynamic loading, or sudden or extreme stress, can additionally—and unexpectedly—reduce strength, as can age, abrasion, and other sometimes undetectable damage. Whenever safety is a factor you should know the RWL of the ropes you are using.

Not so hard to tie

Some people are intimidated by knots, but there is no reason to be. If you can tie your shoe laces, you can tie just about any knot you'll ever need. In fact, the shoe lace knot is relatively complicated and difficult. Technically it is a double-slipped square knot, which most of us can tie in the dark using a genuinely sophisticated technique, even if we can't tie a normal square knot.

The real problem with knots is not lack of dexterity or the temporary difficulty of figuring out how to tie a knot from the diagrams in a book, but that we don't use knots in our daily routine so we forget what we already know about them. It's like forgetting the words to a song.

The way most of us solve this problem is to stick to a dozen or so tried and-true standbys out of the 4,000 plus known knots. These will cover 90% of the jobs you ever need to do. Nearly everyone knows at least half of these already, which means that with 5 or 6 more knots most of us would be fairly competent rope users. When you need a special knot, look it up. A good knot book should be part of your reference library.

Whipping the ends

Before starting to use a rope you need to whip the ends to keep them from unraveling. An easy and effective way is to tape them with electric or duct tape or one of the special tapes or plastics now available. Synthetic ropes can be flame sealed but the fames are toxic, and on larger ropes sharp, finger-cutting edges can form.

The best way to whip the ends is with one of the traditional palm and needle whippings using a special waxed or tarred thread, although few of us have time for such labors on any but our best ropes. The worst—but sometimes necessary—way is to tie off the end with a **Stopper Knot**, usually an overhand or figure eight as in Figure 2.

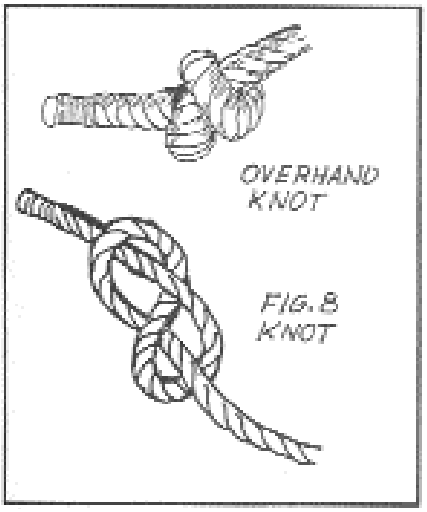

Figure 2. Stopper Knots.

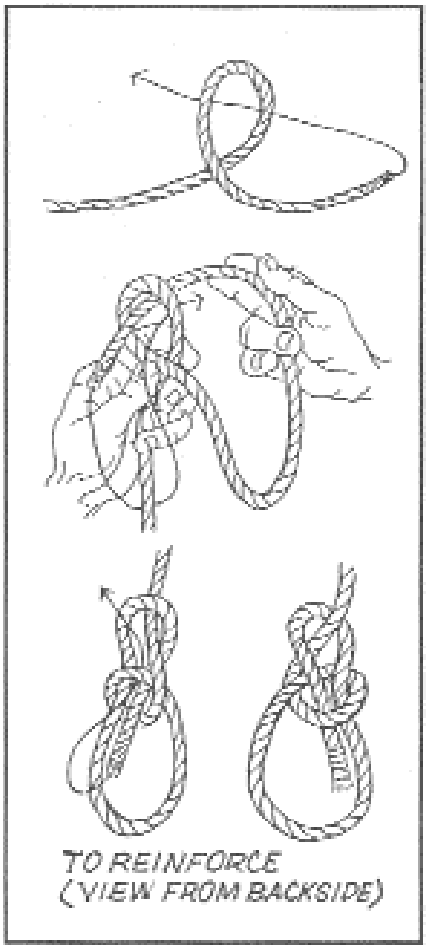

Figure 3. Instructional Bowline. Form the hitch part of the knot by passing the working end up through the loop from below. Continue to form the interlocking loop by passing the working end around to the left behind the standing part and back down through the original loop (which is now the center of the 3 loops you have made—the loop on the right will be the final open loop of the knot). To provide additional security, you can turn the knot over and trap the working end under the hitch as shown.

A knot for the job

Try to think about knots in terms of the jobs you want them to do. I don't mean the specific task such as tying up your dog or making a lanyard for your flashlight or hoisting a chain saw up to your partner in a tree. Rather "job" in the sense of what the knot does to the rope.

Loop knots make a loop in the end of the rope, which common job knots are asked to do. A loop in the end of a rope enables you to attach the rope to an object and do a task with it. There are quite a few good loop knots, but the undisputed king is the **Bowline**. You can't get your black belt in knot-tying without learning it. But don't worry—it's easy. Figure 3 shows what is sometimes called an Instructional Bowline.

For most people what is hard about the Bowline is not so much learning it, but actually trying to tie it in the field when your physical orientation to the knot may be different, or the rope (and you) may be wet, cold, stiff, frayed, or under tension. Or you may have to tie it around an object instead of tying it in hand and slipping it around the object later on.

Five or six different methods of tying it have evolved to cover these kinds of situations. If you take the trouble to learn at least three of these, you will not only be able to get your Bowline tied, but you'll develop a feeling for how to deal with most other knots under similarly difficult field conditions.

When you tie a Bowline directly around an object, use the Bowline Hitch, as shown in Figure 4.

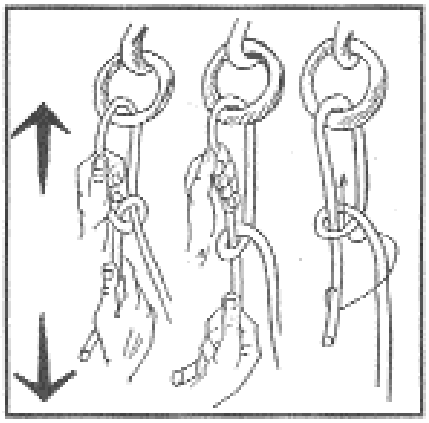

Figure 4. Bowline Hitch. Pass the working end around the object, then bring it back around and make a hitch on itself. Release the rope with both hands and regrasp the working end on both sides of the hitch and jerk the hitch apart—the hitch will transfer to the other side.

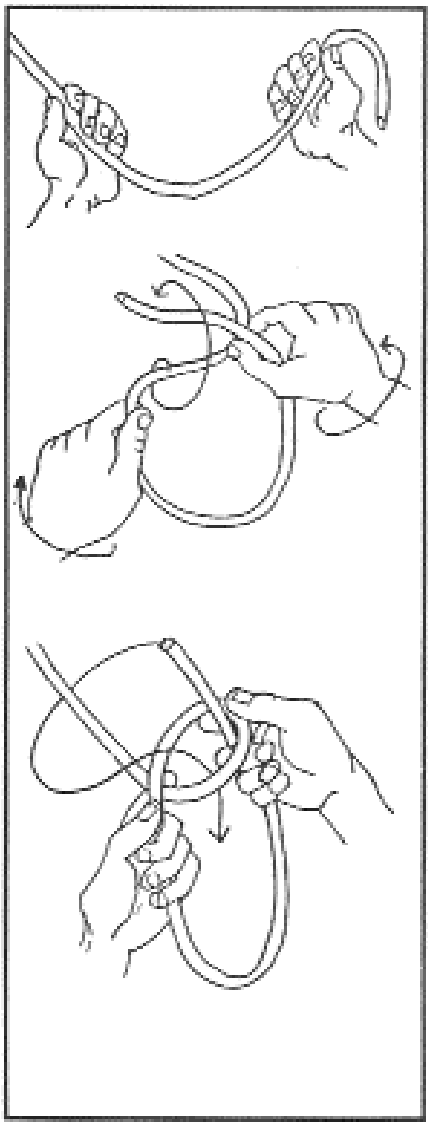

Figure 5. Fingertip Bowline. A} Start with palms up, working end to the right. B) Bring hands together while rotating both wrists so the palms are more or less down. Lay the working end across the standing part, pinching these two parts between the thumb and forefinger of the right hand. C) rotate both wrists back outward. While you are doing this, lower your right hand a bit and raise your left hand, moving it simultaneously in an arc directly away from your body, down, then back under, wrapping a hitch around the working end as shown. Now reach under the standing part with your left hand to grasp the working end and bring it around to insert back down through the hitch as shown by the arrow.

A stylish way to tie the Bowline in hand is sometimes called the **Fingertip Bowline**, a method with some flair, more like the way shoelaces are tied. It is a bit more difficult to learn from a book, but very easy to use and teach in person once you figure it out. Don't forget, style counts. Once you understand this move you will find something like it in the weaver's version of the **Sheet Bend**. If you have trouble figuring this one out, try it very slowly, following the directions as literally as possible in Figure 5.

This method works well even if the standing end is hanging down with

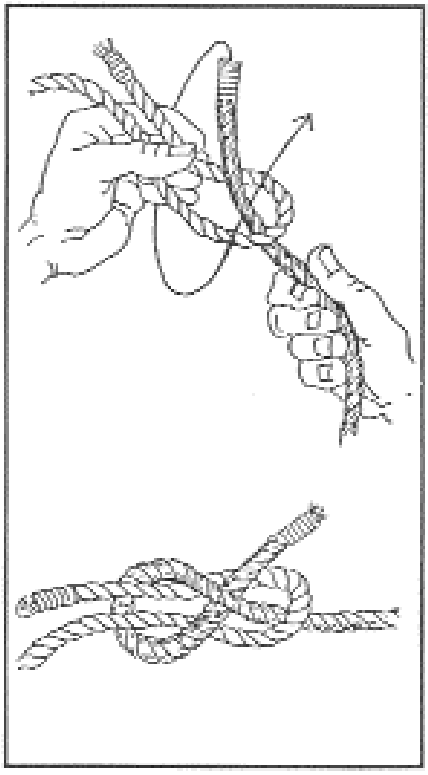

Figure 6. Instructional Sheet Bend. In your left hand form the loop (in the thicker rope if you are using different sized ropes). Position the short working end on the right side and allow the long standing part to hang over the back of your hand with gravity. Form the hitch by threading the other rope up through this loop, passing it all the way around to the right, behind the loop, then pinning it under itself as shown. Both short ends must wind up on the same side. Completed Sheet Bend must be drawn up carefully before use.

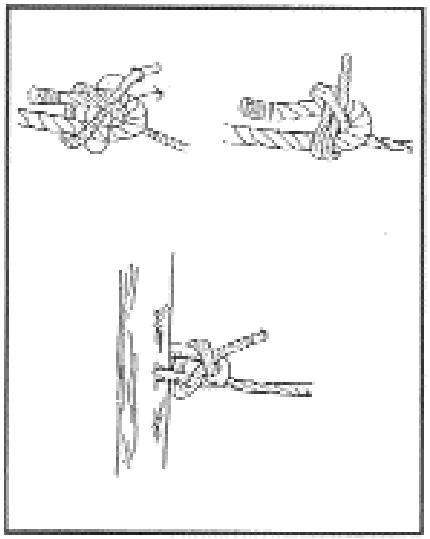

Figure 7. Reinforced Sheet Bend, above, and Becket Bend, below.

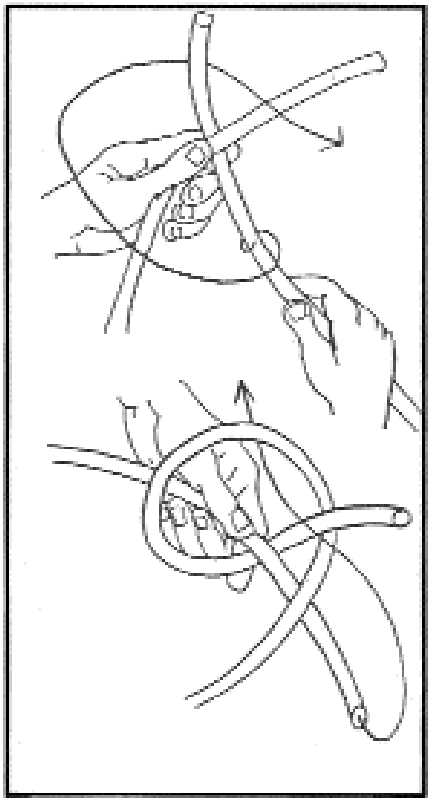

Figure 8. Sheet Bend, weaver's method. Place the end of the left rope over the end of the right rope. Hold between left thumb and forefinger. Grasp the right rope below the crossing and wrap it clockwise around its own working end as shown (twice for reinforced Sheet Bend). Then fold the other end back through the hitch.

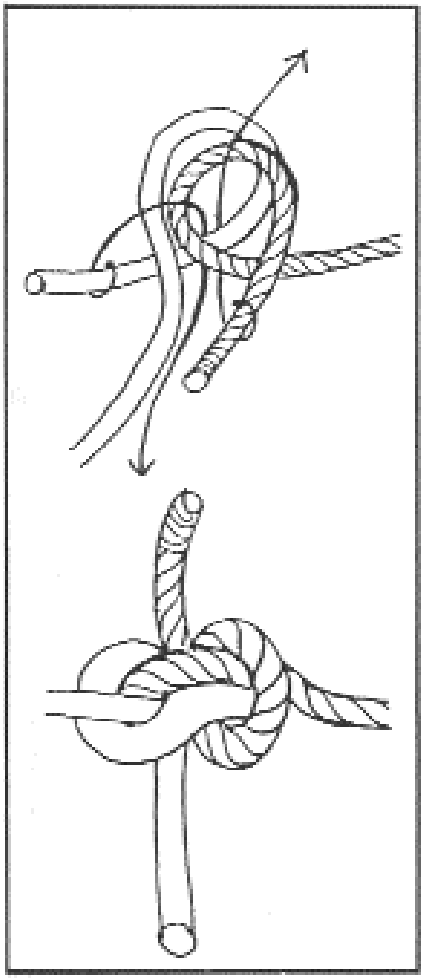

Figure 9. Zeppelin Bend. Form the two loops as shown and lay the right loop on top of the left loop. Thread the ends through the center from opposite directions as shown by the arrows.

gravity but, to reduce the confusion while learning, you may want to tie the standing end off to another object so that it leads to your hands as shown in the drawings. Try this exercise: tie off to a table leg or drawer handle or other object with a Bowline Hitch, then tie a Fingertip Bowline in the other end.

When there is a possibility of the Bowline slipping, you can tie the working end off to the standing part with any of a number of hitches—Two Half Hitches being about as good as any—or directly reinforce it in any of several different ways, one of which is shown in Figure 3, at the bottom.

A **Bend** is a knot that attaches the end of one rope to the end of another (or itself). The classic bend is the **Sheet bend**. Although it is not a particularly secure knot, especially in synthetic rope, it can easily be reinforced. It is the standard utility bend, especially when joining different sized ropes.

If you take a look at the Sheet Bend you will see that it is virtually identical in form to the Bowline, consisting of one hitch interlocking with one loop. Turn it over and note how each stops the other from slipping out -a very elegant formation.

The instructional way to tie the Sheet Bend (Figure 6) involves forming the loop first, then threading the hitch up from under the loop, around behind, and pinning it back under itself. Consider also Figure 7, the **Becket Ben**d, which uses a similar principle to attach a rope to a loop. To make either of these more secure, take an extra turn as shown in Figure 7, top. You have to take extra cue to work the Sheet Bend up carefully, or else it may capsize.

A stylish weaver's method for the Sheet Bend is shown in Figure 8. If you can tie the Fingertip Bowline and the **Weaver's Sheet Bend** you are going to walk around feeling good about yourself.

Since knot tying is as old as our earlier ancestors, you'd think that by now, with all that practice, it would be hard to come up with anything new. But the introduction of synthetics 40 or 50 years ago stimulated the invention of several brand new secure knots for slippery rope as well as new applications for some old knots. **The Riggers Bends**, for example, both old and new, have come into their own as outstandingly secure, easy to untie bends for general use. The handsome **Zeppelin Bend** (Figure 9) was used to tether dirigibles. It has a better lead than the Sheet Bend, is stronger, and more secure.

Hitches attach a rope to an object or another rope. Snug hitches are tied directly around the object. Loose hitches involve passing the rope around the object and tying it back on itself.

There are more hitches than anyone could hope to learn. They are indispensable and a lot of fun to tie. You should study the **Half Hitch**, the knot called **Two Half Hitches** (Figure 10, bottom), maybe the Clove Hitch (Figure 11), and a few others.

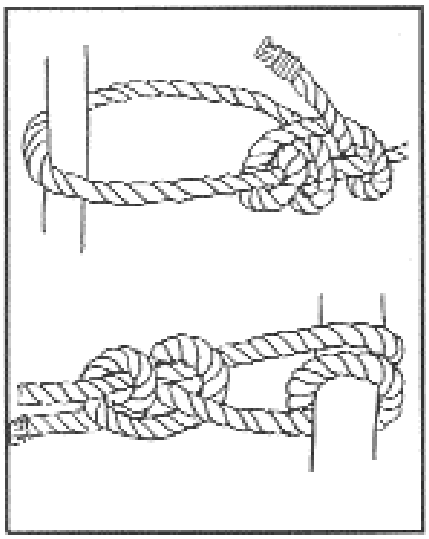

Figure 10. Rolling Hitch, above, and Round Turn and Two Half Hitches.

The versatile Rolling Hitch

But if you had to pick only one hitch, you couldn't do much better than the **Rolling Hitch** (Figure 10, top). Just knowing that it also goes by at least five other names **(Tent Peg Hitch, Tautline Hitch, Midshipman's Hitch, Magner's Hitch, Magnus Hitch)** lets you know that craftsmen both ashore and at sea have treasured it. It is adaptable to many different tasks, easy to tie, easy to untie, strong, secure, and—rare for knots—adjustable. It can be tied as a loose hitch or snug hitch. It is an important rescue knot. And it is easy to remember.

The rolling hitch is probably most often tied as a loose hitch that is, the rope is first led around the object and then tied back on itself with what is known as a Round Turn and then secured by a Single Half Hitch (Figure 10). It's hard to believe such a simple knot could be so reliable. Although it is adjustable, it won't slip under tension. Put the round turn on the side you don't want the knot to slip toward. You can make the hitch in either the same direction as the round turn, or opposite it. If slipping is a problem, the second half of the round turn can be slipped over the first for added friction. When this hitch is tied directly to an object as a snug hitch it

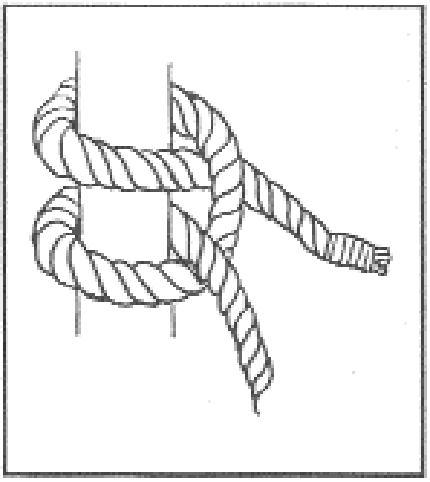

Figure 11. Clove Hitch.

is considered the most reliable single knot under lengthwise puff.

These fundamental loops, bends, and hitches will enable you to put your rope to use. Don't neglect to work them carefully into their final forms. Incorrectly tied knots can be dangerous. You can expand naturally on this core as you learn the other knots you need to get your work done. It helps to carry a practice cord around in your pocket. You'll be surprised how often you find yourself experimenting with it. Moreover, a lot of good knot tiers are positively compulsive about demonstrating their currently favorite knot to any one who will listen.

(Jim Sullivan Is a retired landscape contractor working on a book tentatively titled "Learn to Tie Knots," due out soon. This article is extracted from the chapter on Materials. For more information write Knots, P.O. Box 92, Bodega, CA 94922. Phone: (707) 874-2174.) Δ