



Basic Knots, Bends, and Hitches



NASAR's choice of 'knots, bends, and hitches' was conceived in the 1980's by a group of SAR volunteers from North Carolina whose skills were driven by fire service training. The knots they chose were those they were most familiar with and generally were from the family of 'figure-of-eights'. Though popular, they have several shortcomings and may be outdated. When a figure-of-eight knot has been loaded it can be very difficult to untie. When doing any follow through versions an operator can forget to finish the complete retrace. All figure-of-eight versions require more rope than other choices. They are also bigger in bulk than other choices.

Maybe it is time to take a comprehensive look at how knots, bends, and hitches are used and which one would be best for each application. The choices need to be safe, easy to evaluate, easy to untie, but are not at risk of untying unexpectedly, and use the least amount of rope or webbing. The various categories of use should be defined and then the best knot, bend, or hitch chosen to complete each need. By definition a knot is a stand-alone creation in a rope; a bend joins two pieces of rope together; and a hitch incorporates a foreign object into a rope creation, which if removed will destroy the creation.

As more complicated rope rescue skills are mastered these rope creations will be some of the building blocks.

This test has been peer reviewed by some current active rope rescue enthusiasts. Their comments and concerns have all been addressed. It has also been reviewed by a representative of the Mountain Rescue Association.

STOPPER KNOT:

Use: Whenever ropes are deployed it is important to know where the end of a rope is so you will not slide off the end. A chosen knot must stay in place and be able to be felt.

Choice: blood knot (double overhand)

Discussion: Compact, stays in place, easy to feel, and should be placed one meter from the end of a working rope in use to alert the user that the end of the line has been reached. The extra meter of available rope provides material to resolve possible issues.



blood knot

LOOP KNOT: (adjustable)

Use: To provide a fixed loop of a required size to secure a rope to something, often an anchor or maybe around your waist.

Choice: bowline with a retrace safety

Discussion: The created loop should be only slightly larger than the object it goes around, be that a carabiner, a tree, a person, et cetera. It is easily untied and requires less material than a figure-of-eight on a bight or a figure-of-eight follow-through. The bowline's retrace safety passes the running end back through the knot and brings it out parallel to the standing part.



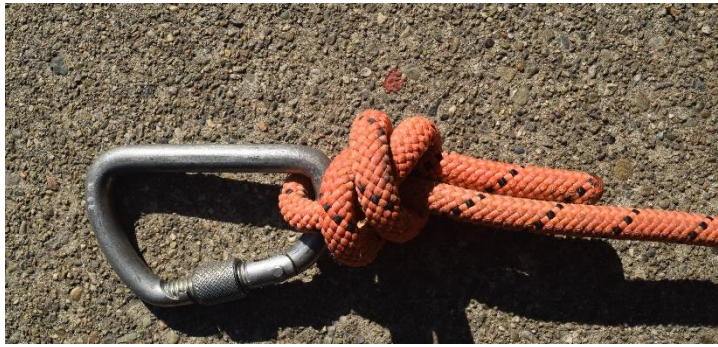
bowline with retrace

LOOP KNOT: (gripping)

Use: To secure a rope to an object in a way so the rope grips the object and will not slip.

Choice: poacher's hitch (double overhand noose)

Discussion: Knot tightens down on object it is around, be that a carabiner, a ring, or a bar, and is very compact. It is actually the stopper knot where the standing part goes back through the knot.



poacher's hitch

BEND:

Use: Join the ends of two ropes together.

Choice: double sheet bend with retrace safety (mistakenly called 'double becket bend')

Discussion: Easily untied. Can work with ropes of different diameters. Even allows you to tie a rope to material like a tarp for example. The retrace safety passes the running end back through the knot and brings it out parallel to the standing part. Will be a building block later in creating the Blitz anchor.



double sheet bend with retrace

BEND: (alternative)

Use: Joins ropes together that are usually smaller diameters and do not need to be untied.

Choice: grapevine bend (double fisherman's bend)

Discussion: Difficult to untie. Works best on smaller cord and cords of different diameters. Used for making Prusik loops. Requires a minimum tail of .5 cm. (1")



grapevine bend for Prusik loop

HITCH:

Use: Secure a rope or webbing to bars and posts.

Choice: clove hitch

Discussion: Easy to untie. Works well with webbing and cord. Can be used in a series. Used in the assembly of a picket system and securing a litter.



clove hitch

HITCH: (gripping)

Use: Gripping a rope securely at any chosen location

Choice: Prusik hitch with three wraps,

Discussion: Loops are generally 135 cm. (53") and 165 cm. (65"), their position can be adjusted on rope before tension is applied, and extensive successful performance tests have been performed over the past forty years.



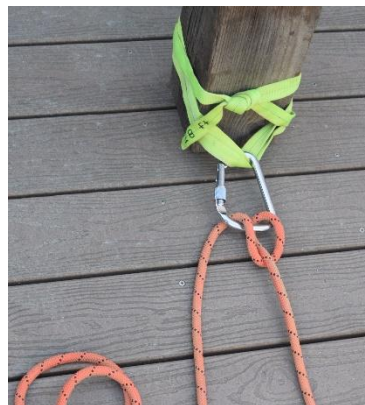
Prusik hitch

HITCH: (adjustable)

Use: Control a loaded rope in a lowering or raising operation

Choice: MB (Münter's) hitch,

Discussion: This friction hitch can be used for descent control, a belay, in work positioning, and tying off a releasable anchor. If load is heavy, use 'double MB variation' with a second loop around standing part. Steel carabiners are recommended when using the hitch. Proper hand motion is critical. **DANGER:** Control will fail if operator lets go of rope.



MB (Münter's) hitch

BEND: (webbing)

Use: Tying the ends of the webbing in both the following Harness Tie and the Anchor Tie.

Choice: Flat Overhand Bend

Discussion: Pull out parallel pieces of webbing and tie an overhand knot using both pieces. Allow at least 15 cm. (6 in.) tails



flat overhand bend

HARNESS TIE: (webbing)

Use: Using approximately 6 m. (20 ft.) of webbing tie an emergency harness.

Choice: 'Emergency Harness'

Discussion: Place the mid-point of your webbing on one hip. Webbing is wrapped around waist and one piece wraps over the other piece twice, forming two elbows. Pull snug below navel, and the extra elbow will hold it in place. Ends that hang down will have different lengths. Pass both between the legs and up around thighs. On each side pass webbing under itself. Pull back until snug. Pass the ends back around the waist to use up all the material. The ends should be at your hip. Secure ends with a bend. Good choice is Flat Overhand Bend with 15 cm. (6 in.) tails. Connect carabiner through first double twist and all the wraps on the waist. The finished harness will stay at waist when not under tension. If a square knot is involved in the construction it must have overhand safety knots.



midpoint on hip



overhand with extra
overhand



around thighs and under itself



finish wraps and secure

ANCHOR TIE: (webbing)

Use: Construction of a basic anchor around any object.

Choice: Wrap 3 – Pull 2

Discussion: Wrap webbing around object three times and connect ends with a bend. Pull out two solid loops for anchor attachment. The connecting bend will be on the visible, load side. The best choice for the bend is the Flat Overhand Bend with 15 cm. (6 in.) tails.



W3-P2 with flat overhand bend

WARNING:

All knots, bends, and hitches will probably reduce the strength of the material used by about twenty-five per cent (25%).