WESTBURY FIRE DEPARTMENT

RESCUE TECHNICIAN KNOT GUIDE

RESCUE TECHNICIAN - BASIC

September 20, 2014 8AM-5PM - Location T.B.A
September 27, 2014 8AM-5PM - Location T.B.A
October 11, 2014 8AM-5PM - Location T.B.A

This Class is an **ADVANCED** level course, you are expected to know and be proficient at tying knots prior to attending the course.

Attached are knots that will be used in the class, read over and practice tying knots so that you may become proficient.

Dates will be announced for hands on refresher of all these knots you are urged to attend these tutorials.

Any Question fell free to ask.

Thanks
Instructor Ryan Roberts

Knots for Rope Rescue

Introduction

Knot tying is a skill. The knots learned in the lesson must be practiced by each individual team member to ensure that you can tie any of the knots without mistake or delay. All team members must be able to tie all the knots used by the by the team.

A rescue team should relay on a small selection of knots that do their job well. By standardizing the knots used, there will be fewer knots for the team members to learn. During a rescue, checking the knot is much easier since a particular knot will be expected at a given position. This lesson utilizes the most common name for a given knot although the same knot may be known by several names.

The knot for rope rescue which are used throughout this course are:

Figure eight family of knots

Simple Figure of 8
Figure of 8 on Bite
Figure of 8 follow through loop
Figure of 8 bend - Join 2 Ropes
Double Loop figure of 8

Other Knots

Double Fisherman
Prusik Hitch
Overhand Knot
Safety Knot
Square Knot
Clove Hitch
Butterfly Knot

Webbing Knots

Water Knot
Mariner’s knot

What makes a good Knot

Strength

Knot strength is a measure of how much the knot will weaken the rope. Bending weakens rope and knots are nothing more then tight bends. The following table of relative strengths shows the strength of a rope with a particular knot in it and is given as a preengage of the strength of that rope without the knot.

Relative Strength of Knots for Singke Kernmantle Rope

Bends	Strengths in lbs.	Percent Lost
Double Fisherman's Knot	8,440	21 %
Figure 8 Bend (Flemish Bend)	8,640	19 %
Loops		
Figure 8 loop (with a bight)	8,560	20 %
Figure 8 Loop (follow through)	8,640	19 %
Double figure 8 loop	8,820	18 %
Figure 9 Loop	9,760	9 %
Inline figure 8 Loop	8,000	25 %
Butterfly Knot	8,000	25 %
Bowline	7,180	33 %
Overhand Loop (with a bight)	9,060	15 %
Overhand Double Loop	7,900	26 %
Rope With A Loop In It (*)		
Figure 8 Loop	6,960	35 %
Inline Figure 8 Loop	6,280	41 %
Butterfly Loop	7,360	31 %
Knots In Wed		
Water Knot	3,060	36%
Overhand Loop	3,120	35 %
Figure 8 Loop (with a bight)	3,360	30 %
Figure 8 Loop (follow through)	3,560	26 %
Web Sling		
Water Knot - Single Loop	5,700	
Water Knot - Double Loop	12,920	
Water Knot - Triple Loop	22,860	

(*) Rope pulled end to end

Dressing a Knot

Neatness counts when tying a knot. Making the rope run smoothly without any extra twists is called "dressing" the knot. When ypu dress the knot, it is stronger and easier to check.

Securing a knot

Some knots like the double fisherman and water knot, tend to be self locking. Some knots, like the bowline, are not particularly secure and tend to loosen when loaded. Because of this, the bowline has been eliminated from the knot selection for rope rescue.

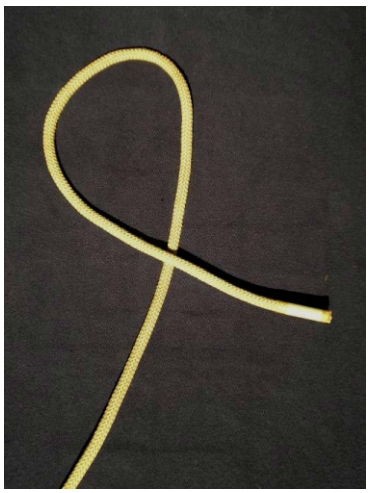
Rescue Knots

Knots are grouped according to what they do, The most common knot family is the Figure 8 Family of knots. In webbing, knots based on the overhand family work best. These knots have been chosen for ease of use, minimal loss of strength and test results proving the reliability of the knot.

As part of the course, given 8' of rope of minimum ½" diameter you shall properly tie each of the following knots completing all operations in sequence without safety violation and with 100% accuracy.

FIGURE of 8

This knot is the basis for the other figure 8 knots, It is also used as a stopper knot.



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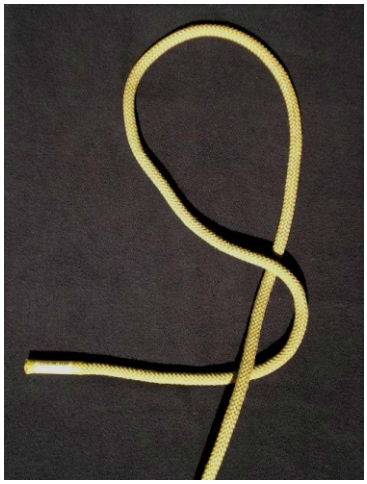
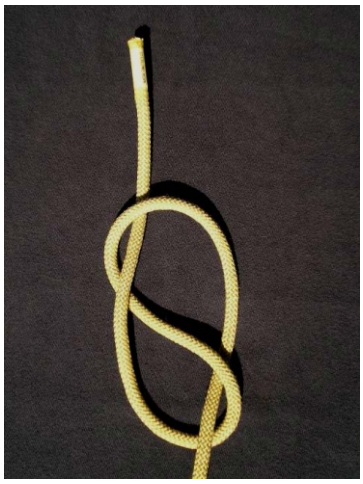
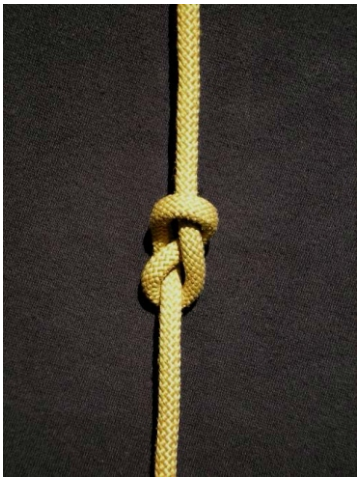
Make a loop



Bring the end around the standing part



Put the end through the loop



Dress and set the knot

FIGURE of 8 on BIGHT

This is a strong knot and is less bulky then double loop figure 8. It is used primarily for anchor systems and for attaching single person loads on to the rope.

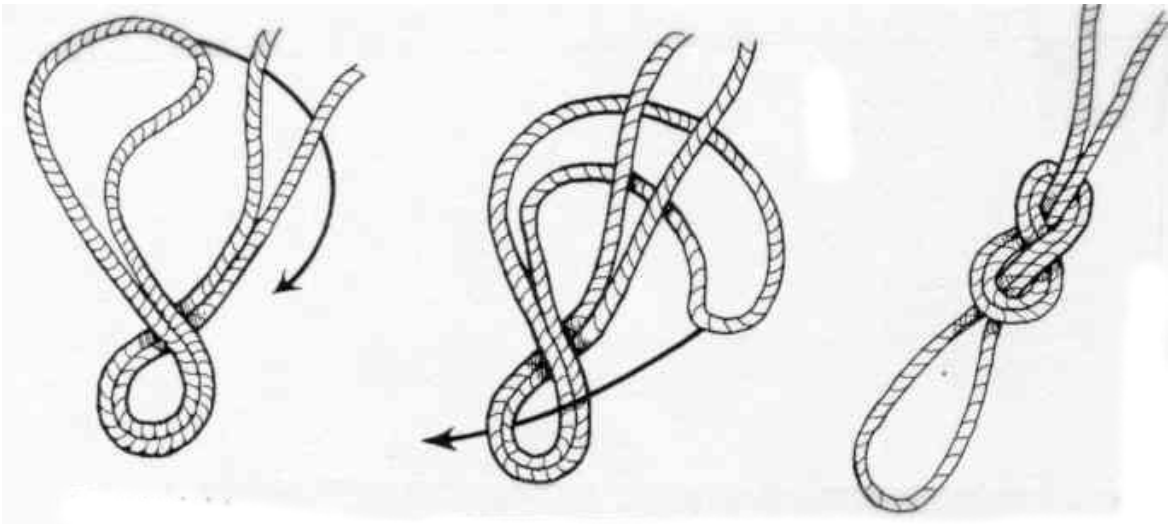
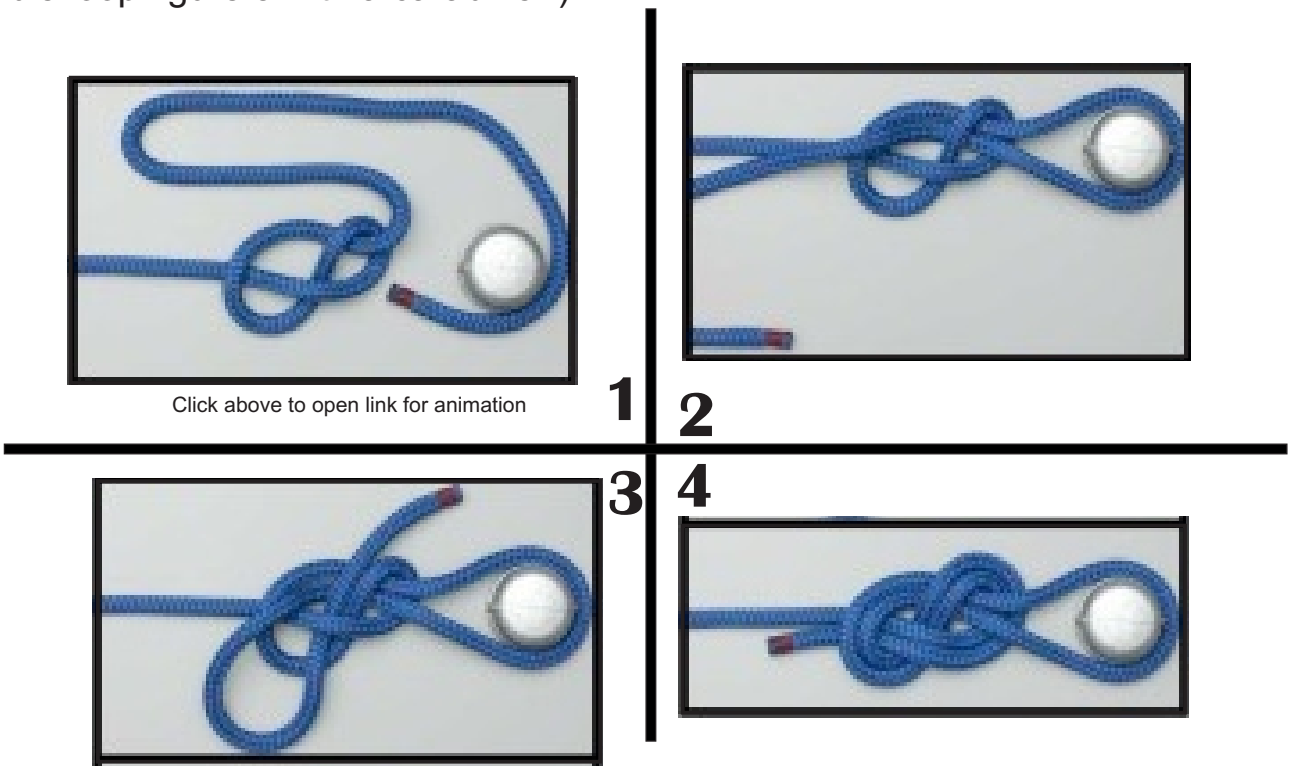


FIGURE of 8 Through Loop

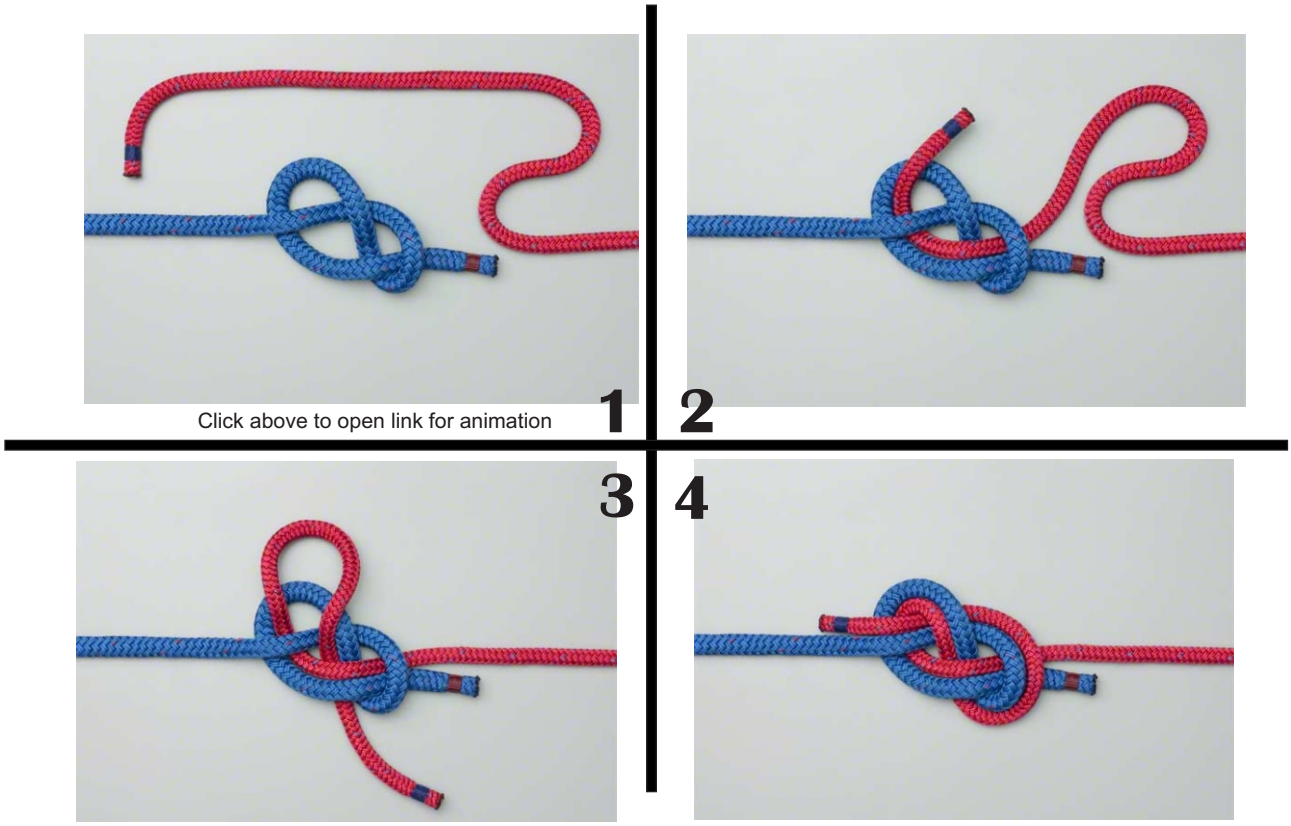
This knot is used to tie around an anchor and tie into a harness when the loop in the rope cannot be put over or through the object (although we usually use the figure 8 on bight or double loop figure 8 with a carabiner).



make figure 8 - loop around object - follow 8 back around

FIGURE of 8 Bend - Joins 2 Ropes

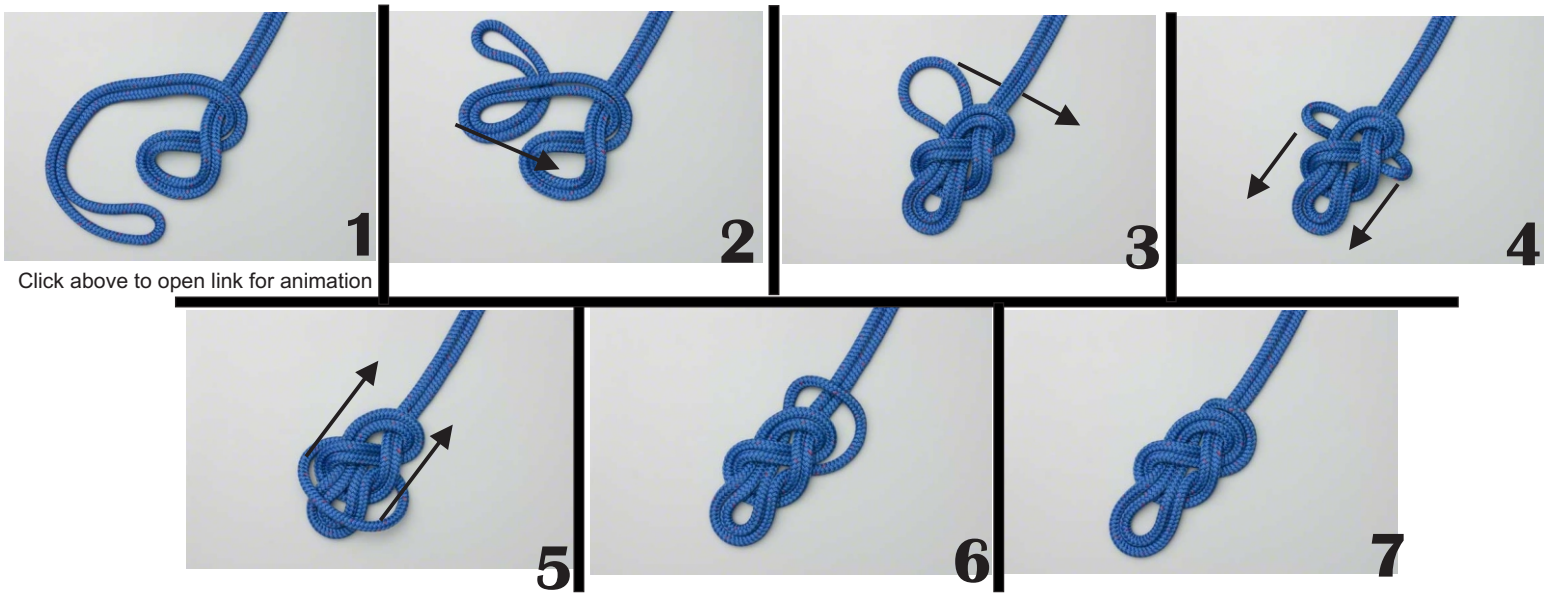
Used to join 2 ropes togethers.



make figure 8 - follow 8 back around using the 2nd rope

DOUBLE LOOP FIGURE of 8

This is a strong knot and the double loop reduces wear and strength loss from the rope being bent around a carabiner. It adjusts easily and is a very versatile knot for anchor systems. It works well for anchor systems having two, three, or more points and the self-equalizing and omni-directional efficiency of the knot is increased when it is tied in rope rather then web. This knot can be tied in the end of the main line, or you can use a separate anchor point. You can also have a ring incorporated for stretcher attachment.



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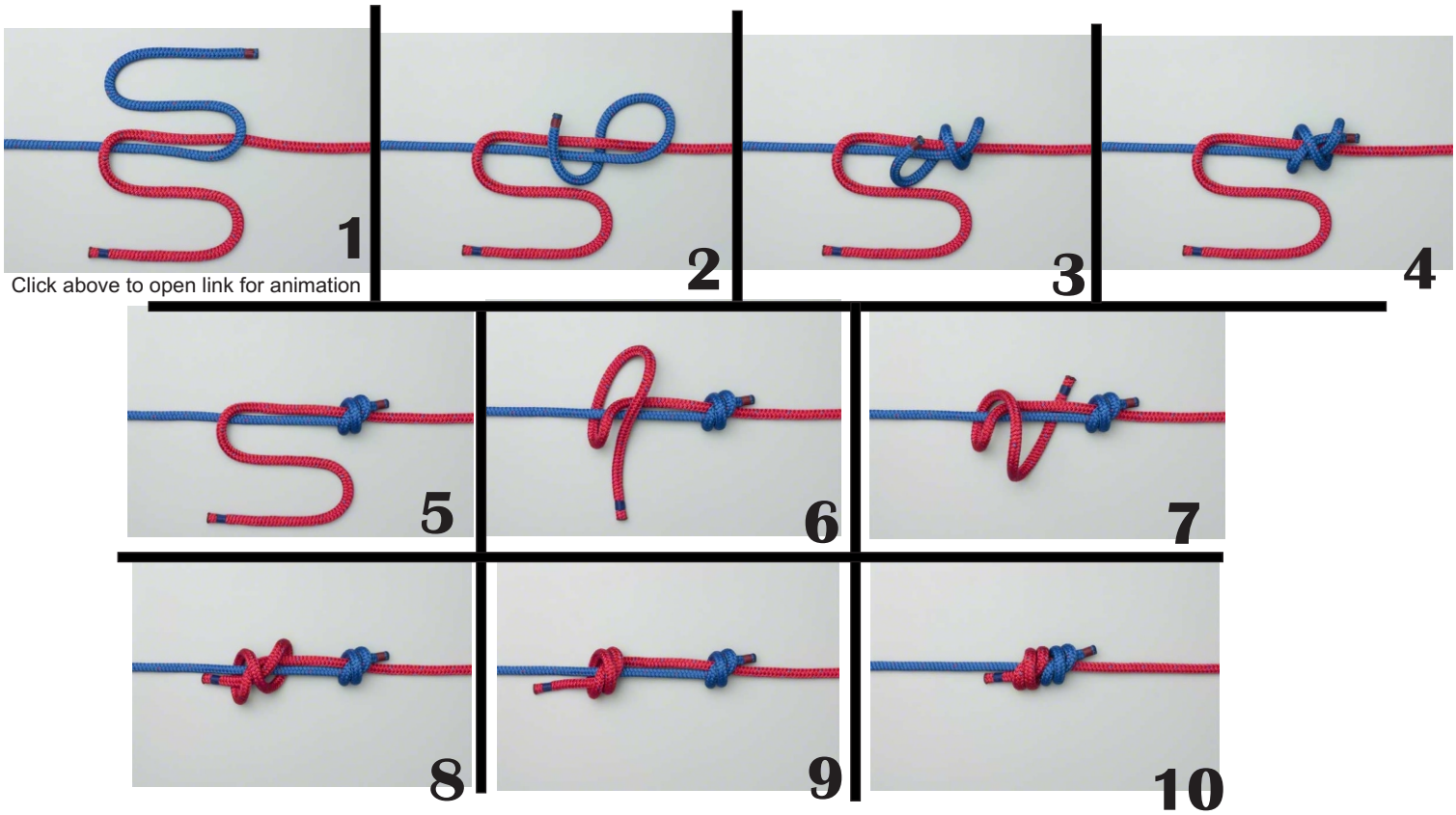
DOUBLE FISHERMAN KNOT

Used to connect two ropes or to make a rope into a loop. It is a strong, self locking, very secure knot. This knot is primarily used with prusik cord in this course.



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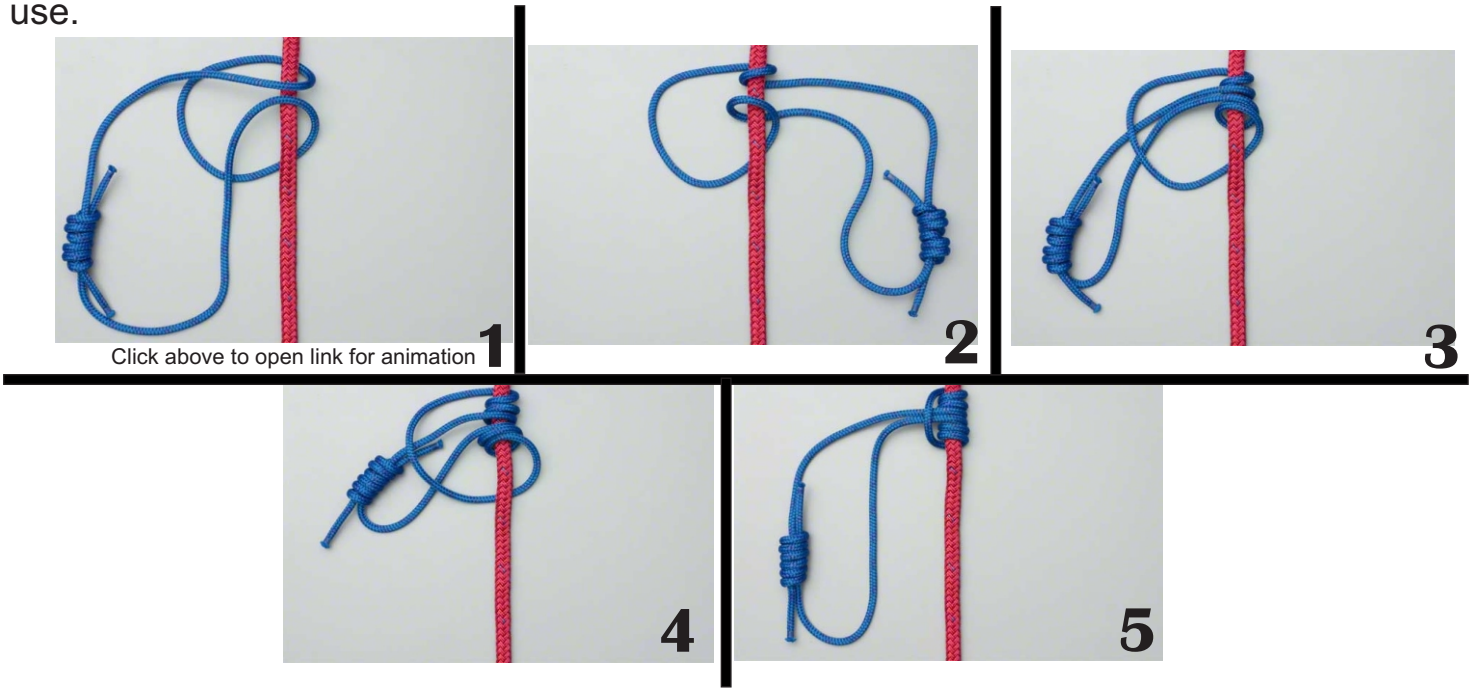
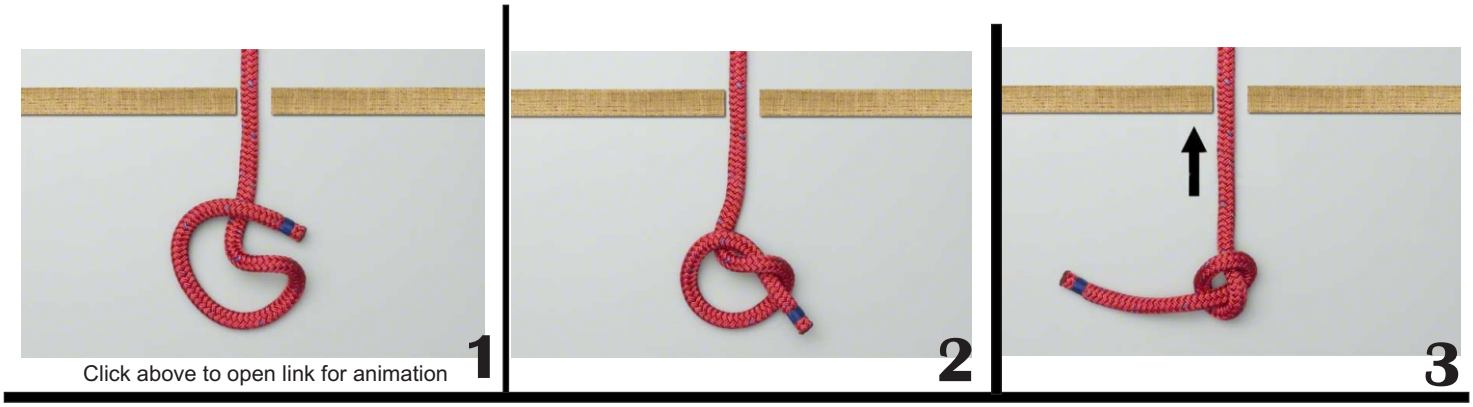
PRUSIK HITCH

Used to connect prusik loop to rope. This knot holds when loads but slides when loose. We use dual wraps for personal use and triple wrapped tandem lines for rigging a system use.



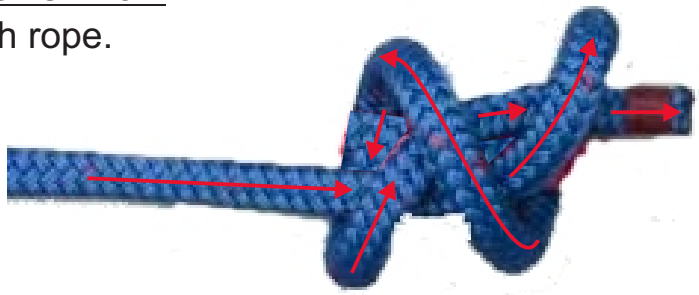
Overhand Knot

Good choice for use with Webbing. It also used as a back up/ safety knot with rope.



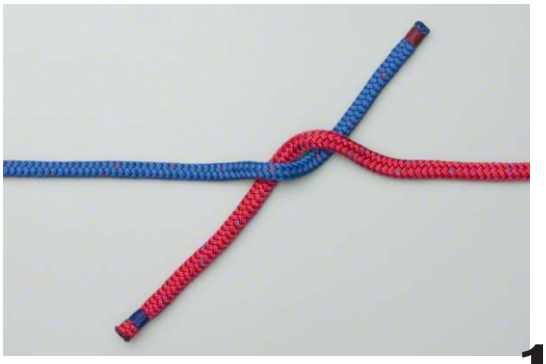
Safety Knot - Half Double Fisherman

Used as a back up/ safety knot with rope.



SQUARE KNOT

Used in some victim packaging systems. **Must be backed up with a Safety Knot.**



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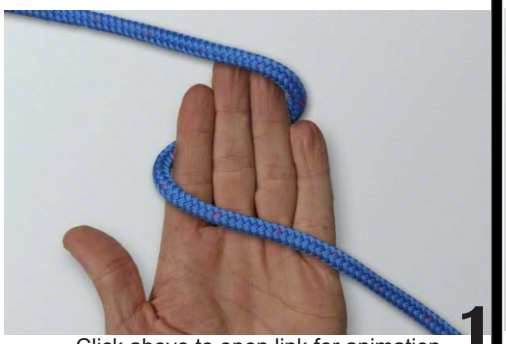
BUTTERFLY KNOT

Used to create a loop in the middle of the rope. Often used for attaching of removal devices or victims to the rescue rope.



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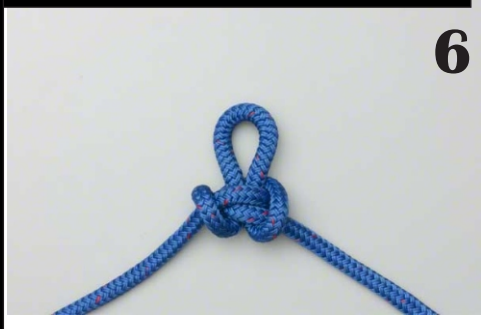

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CLOVE HITCH - Using End

Used as a tie-off in a stretcher lashing and in a ladder rescue system

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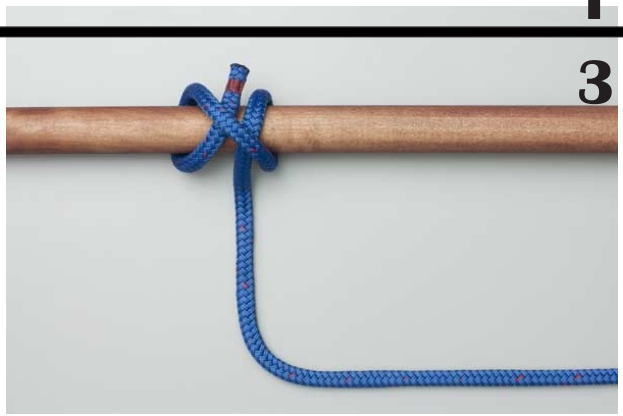

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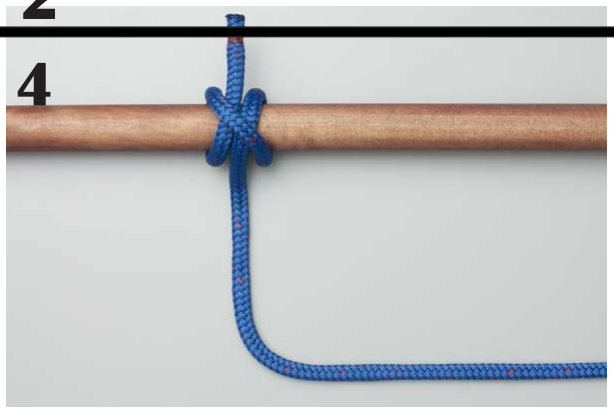

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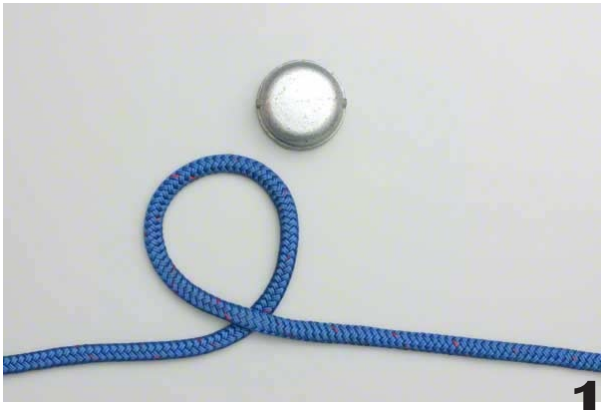
CLOVE HITCH - Using Loop



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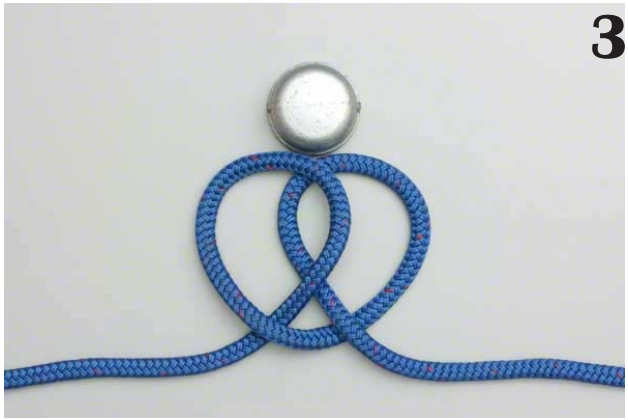

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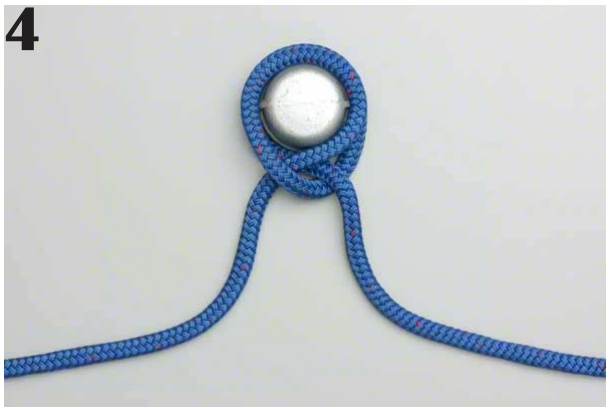

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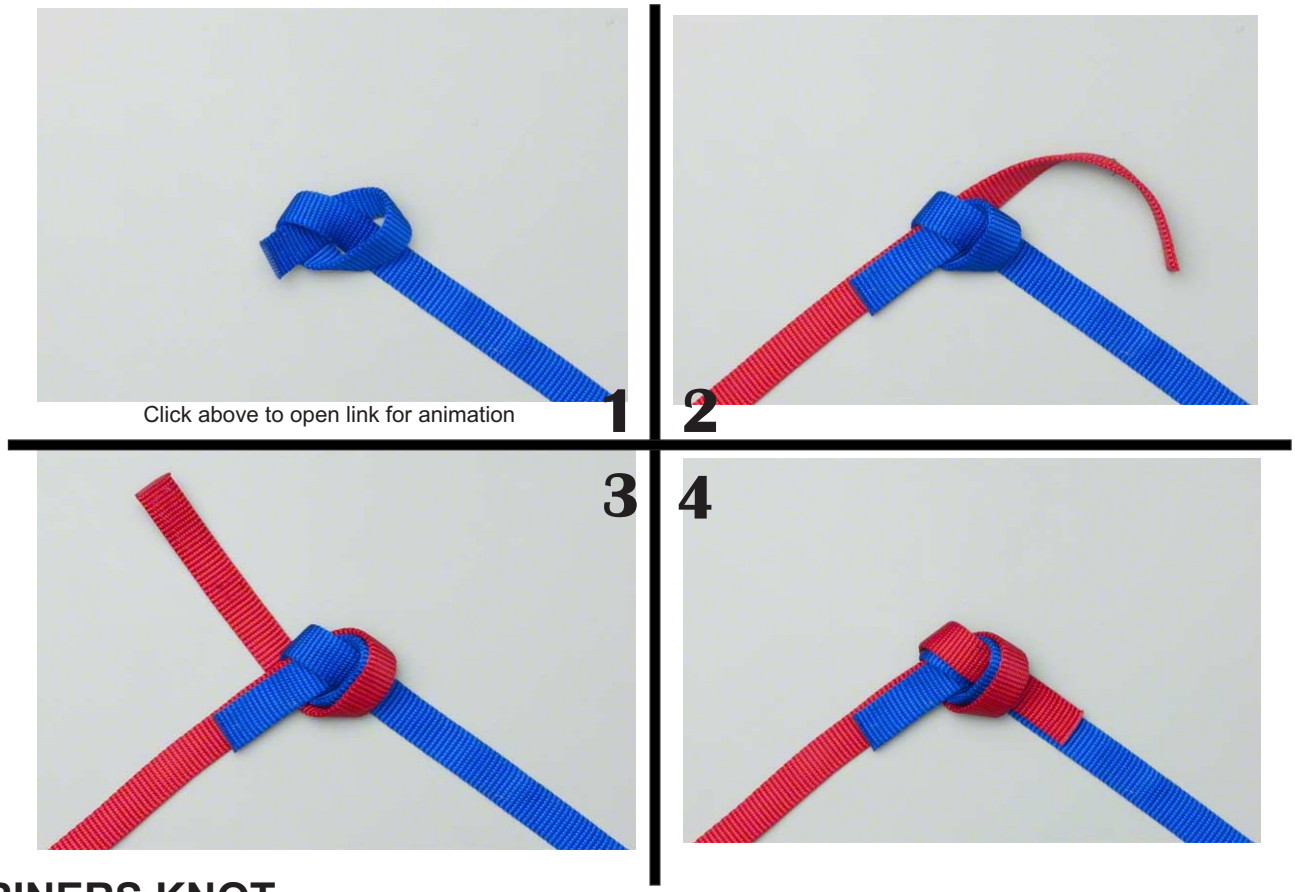
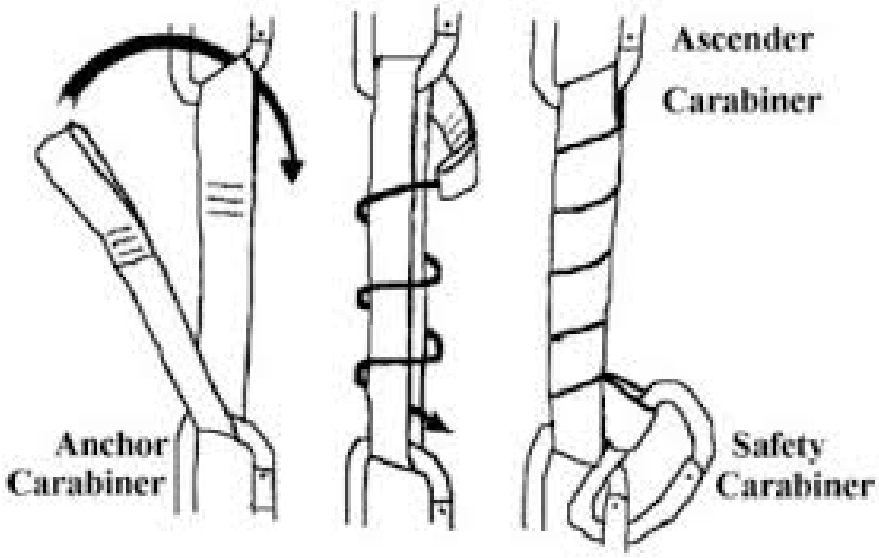
WATER KNOT

Used with webbing. This knot secured by tying an overhand safety knot one each side of the water knot very tightly before using,

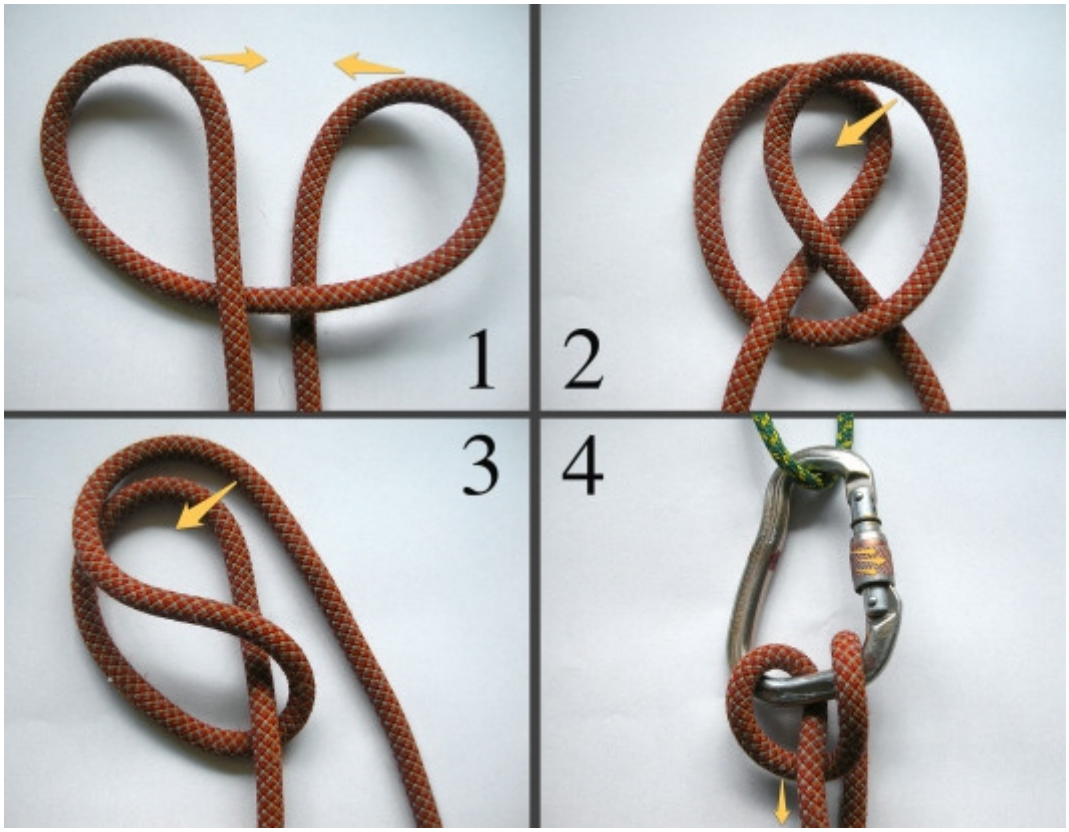


MARINERS KNOT

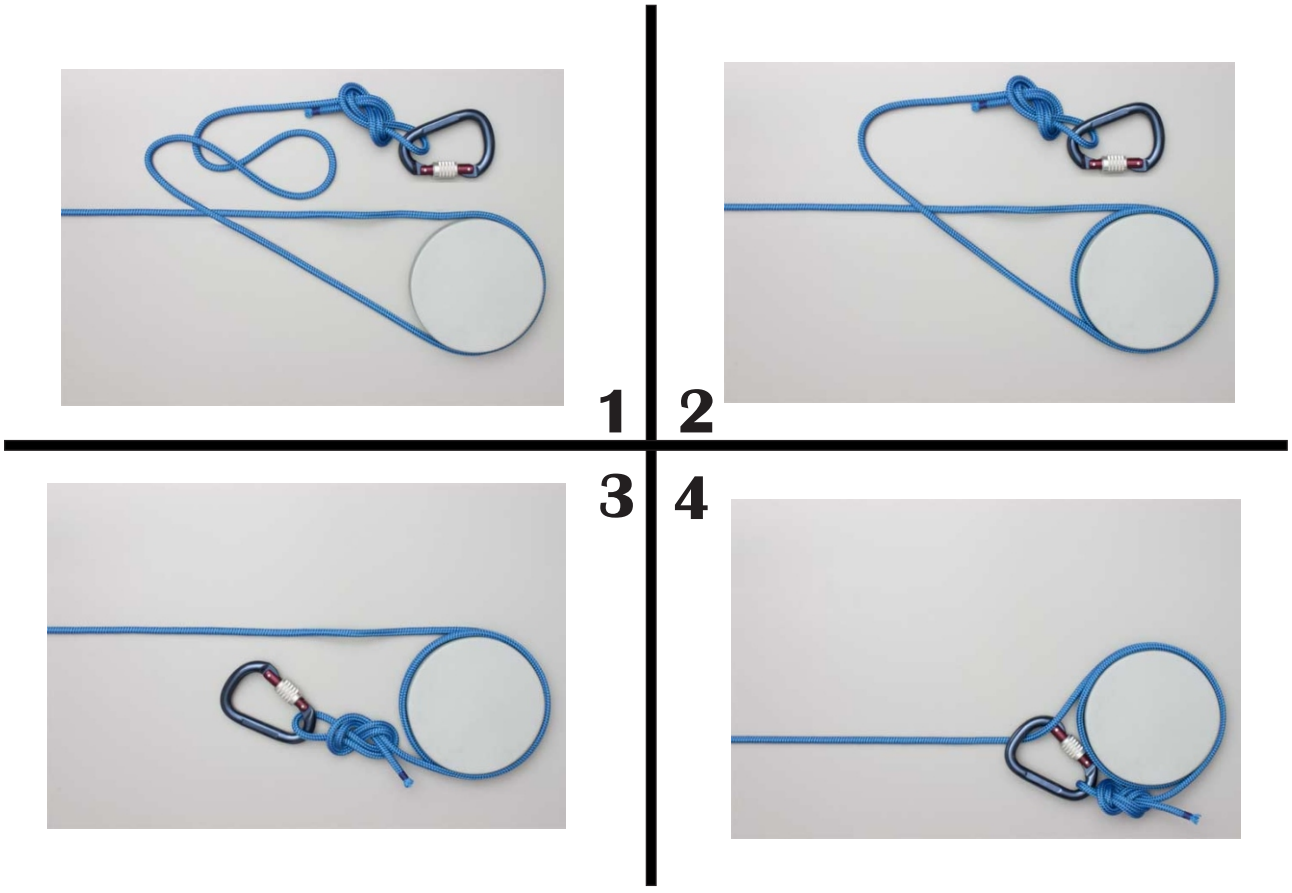
Actually a knot stem that can be used released under load. It is primarily used to connect the brake to the anchor, If you need to release the brake while it is still under load, such as when it is holding a system, the Mariners Knot will free the brake. To untie the knot while it is under load, start with unclipping and removing the carabiner (the loose one) and push the loop back through the web, opposite of how you tied the knot. Start unwrapping the web carefully. As the web starts to slide, let the load transfer gently onto the lowering device or rope. This knot is not the preferred load release device in a high angle environment unless in conjunction with a rated shock absorbing device.



Munter Hitch

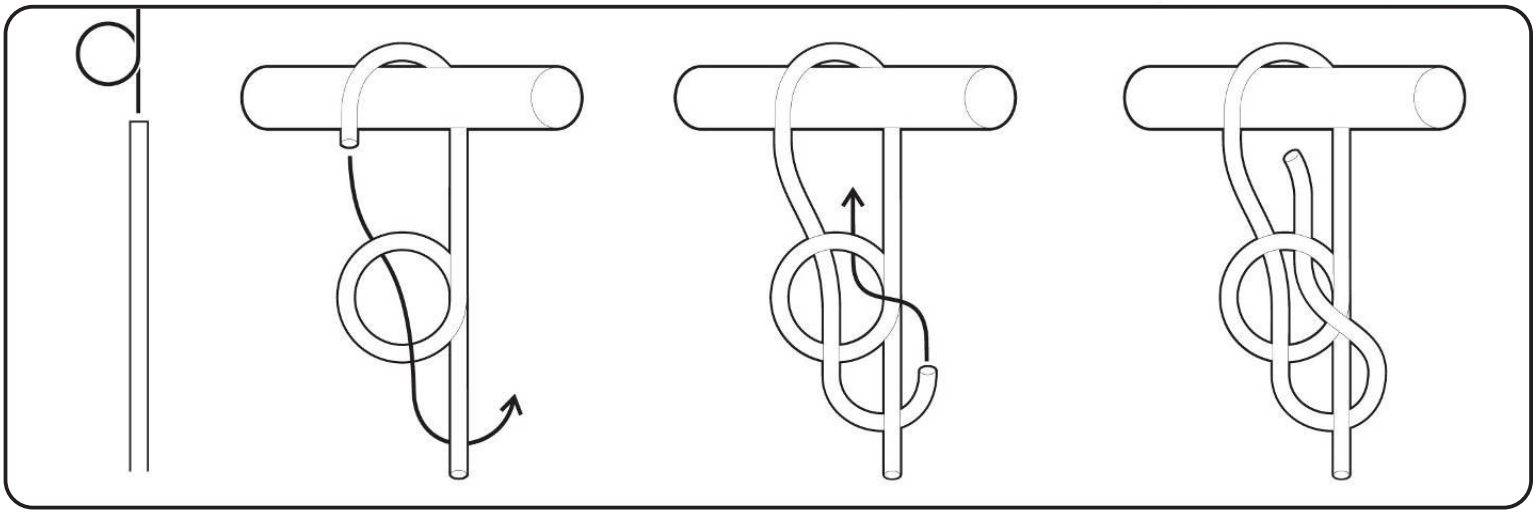


Tensionless Hitch - AKA 4:1Wrap



Bowline

A bowline is used to form a temporary but fixed size loop at the end of a line. It is often called the "King of Knots" because of its many uses. Bowlines are easy to untie even after being under a load. Bowlines are used to tie lines of equal or unequal sizes together.



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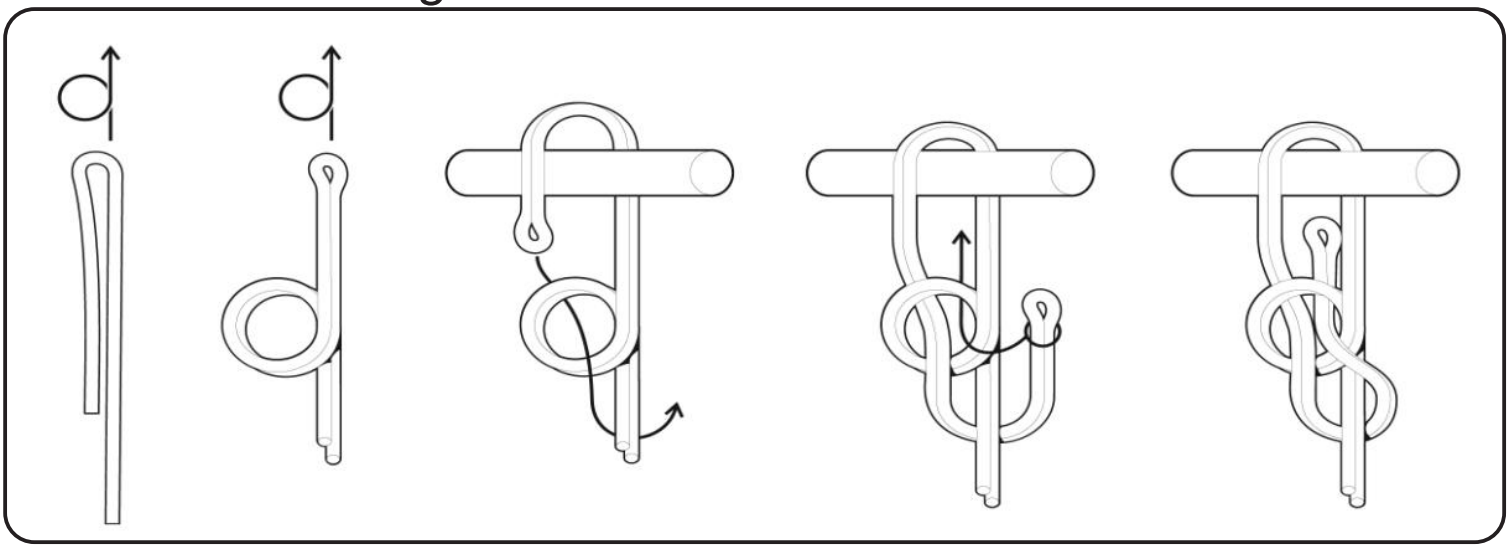
Bowline on a Bight



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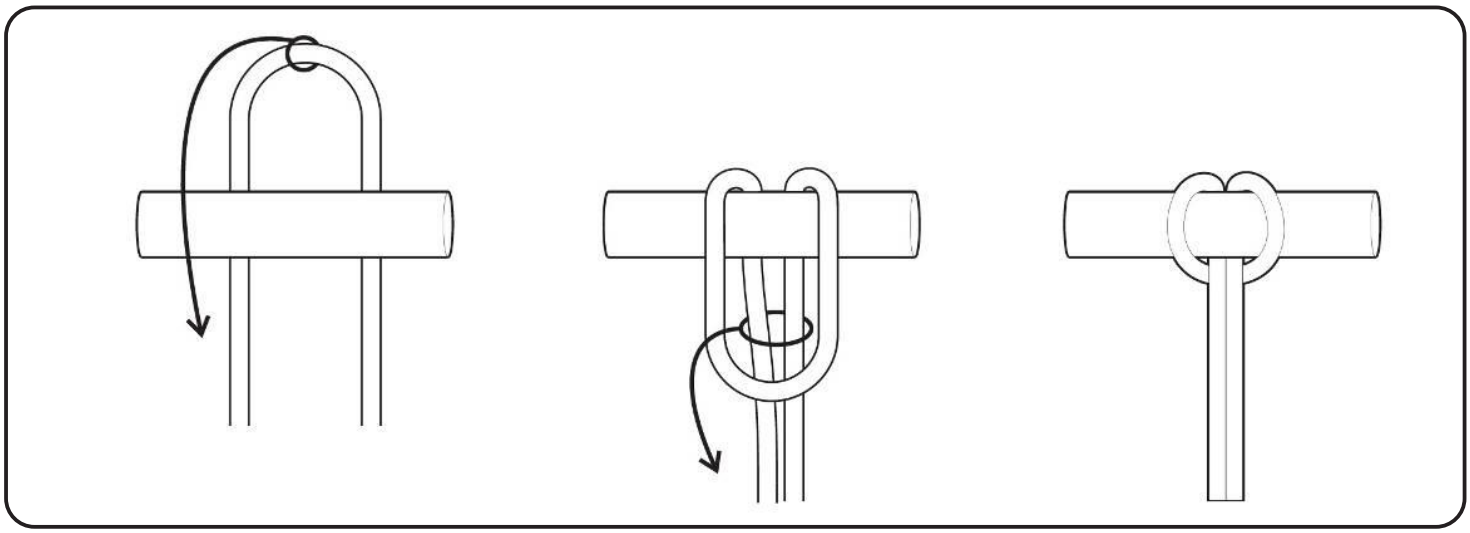
Girth Hitch see animation: (click below)



BECKET BEND

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