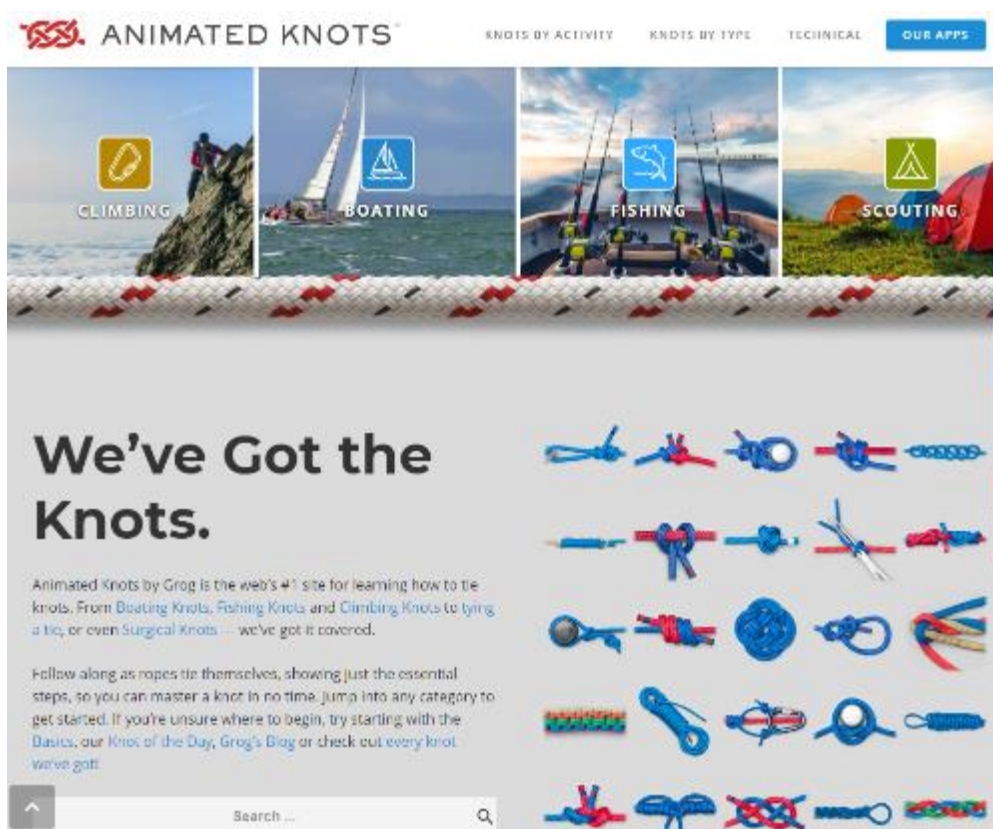


Knots & How to Tie them

Recommended resource –
www.animatedknots.com



SIS Training Safe Participant - Base Module

Knots required for SIS Training Safe Participant (SP)

- Figure 8
- Figure 8 Eye Knot (Fig 8 on the bight)
- Rethreaded Figure 8 Eye Knot
- Tape Knot
- Alpine Butterfly
- Double Fisherman's Bend
- Munter Hitch
- Prussik Hitch

Refer p42 for Trained Participant (TP) additional knots.

Note:

TP must be able to tie all knots listed in their workbook & be able to teach novices to tie the SP list of knots

Figure 8

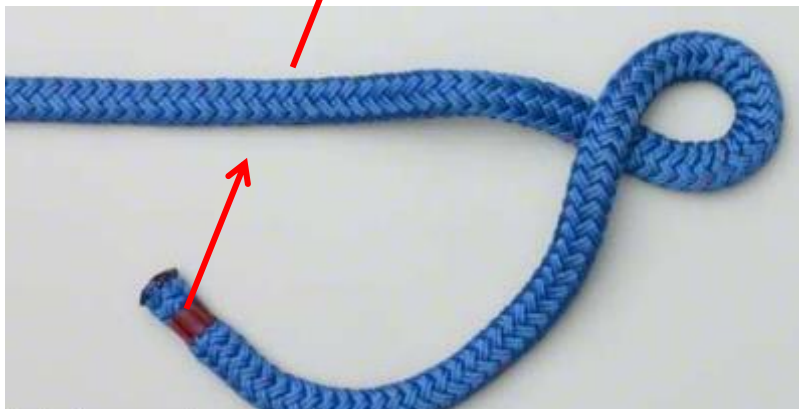
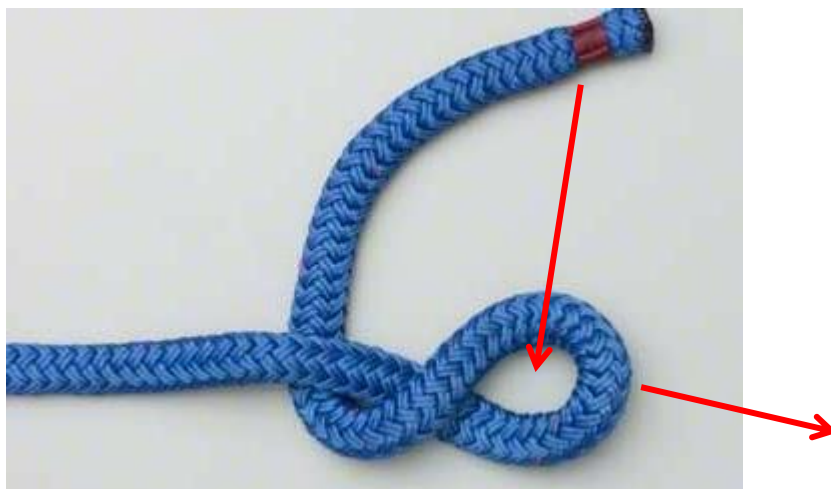


Figure 8 (Flemish) Knot Tying

Pass the tail over itself to form a loop. Continue under and around the standing end. Complete the knot by passing the tail down through the loop.



The knot when formed creates the shape of the numeral 8

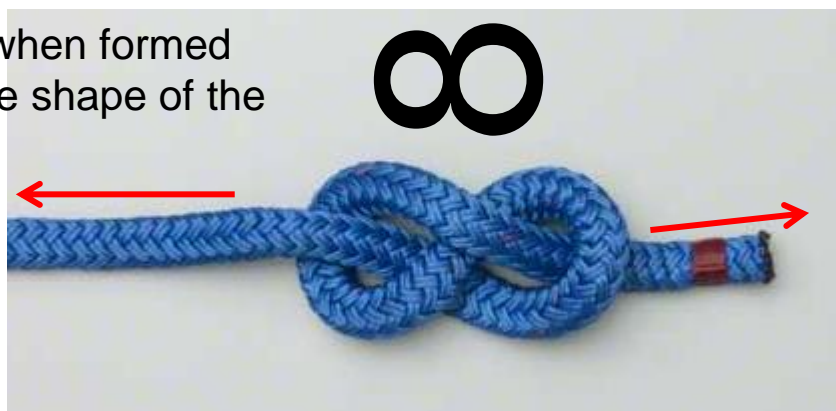


Figure 8 Eye Knot – alt. on the bight

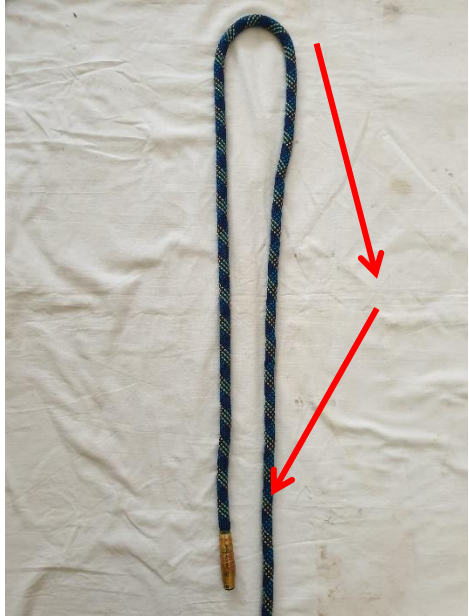

1	Start with a bight (loop) of rope in your hand.	
2	Pass the loop over itself to create the first half of the '8' loop	

Figure 8 Eye Knot – alt. on the bight



2	<p>Complete step 2; Pass the loop over itself to create the first half of the '8' loop</p>	
3	<p>Now pass the loop back under the main rope (both strands)</p>	

Figure 8 Eye Knot – alt. on the bight



4	<p>Push the loop through the loop created at the start of tying the knot – creating the second half of the '8' shape</p>	
	<p>Complete step 4; Pull the original tail loop of rope through the top loop of the '8'</p>	

Figure 8 Eye Knot – alt. on the bight



5	Tighten & 'pack' the knot so all faces of the rope pack close against & in full contact with their nearest rope strand	
5	Check full contact packing by turning knot over to inspect lay of the rope strands	

Figure 8 Eye Knot – alt. on the bight






1	Start with a bight (loop) of rope in your hand.	
2	Pass the loop under itself	
3	Then back over itself	

Figure 8 Eye Knot (cont.)

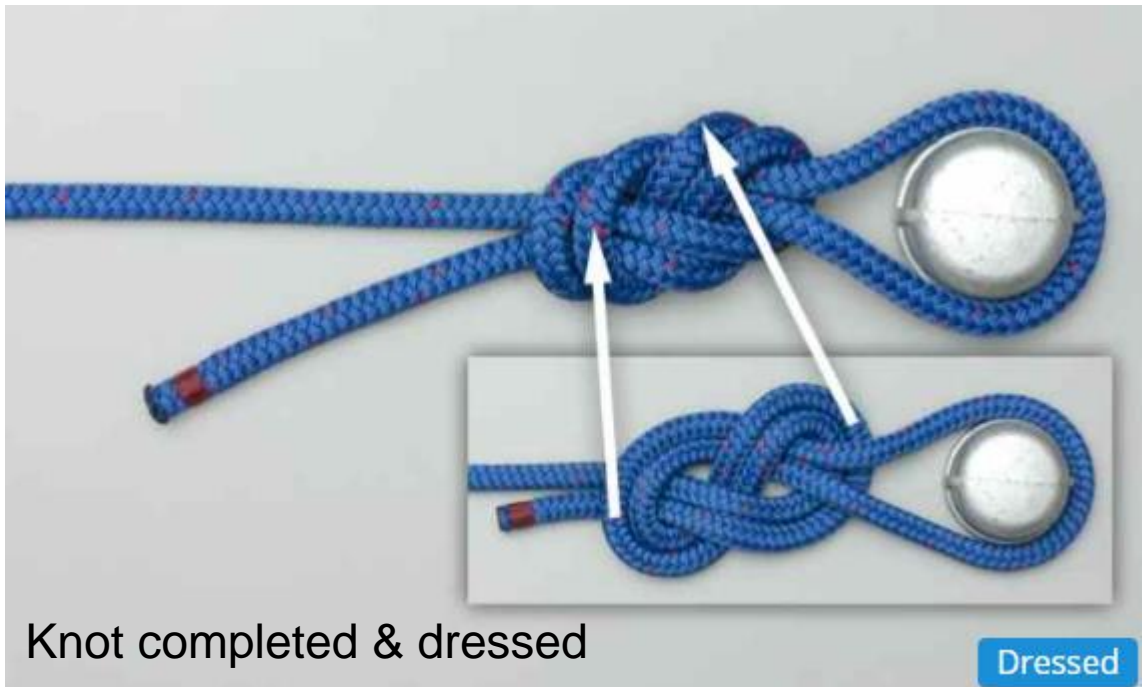
4	and finally through the loop formed from the bottom.	
5	Pull the knot tight and set. A good knot should look the same from both top and bottom i.e. be symmetrical.	

The figure-of-eight eye knot or on a bight is a very useful loop. It is generally tied in the end of the rope, and can be clipped into anything to secure the end of the rope. It is often used to set up a single rope for abseiling, or to be the end of an individual's safety line (usually with a karabiner).

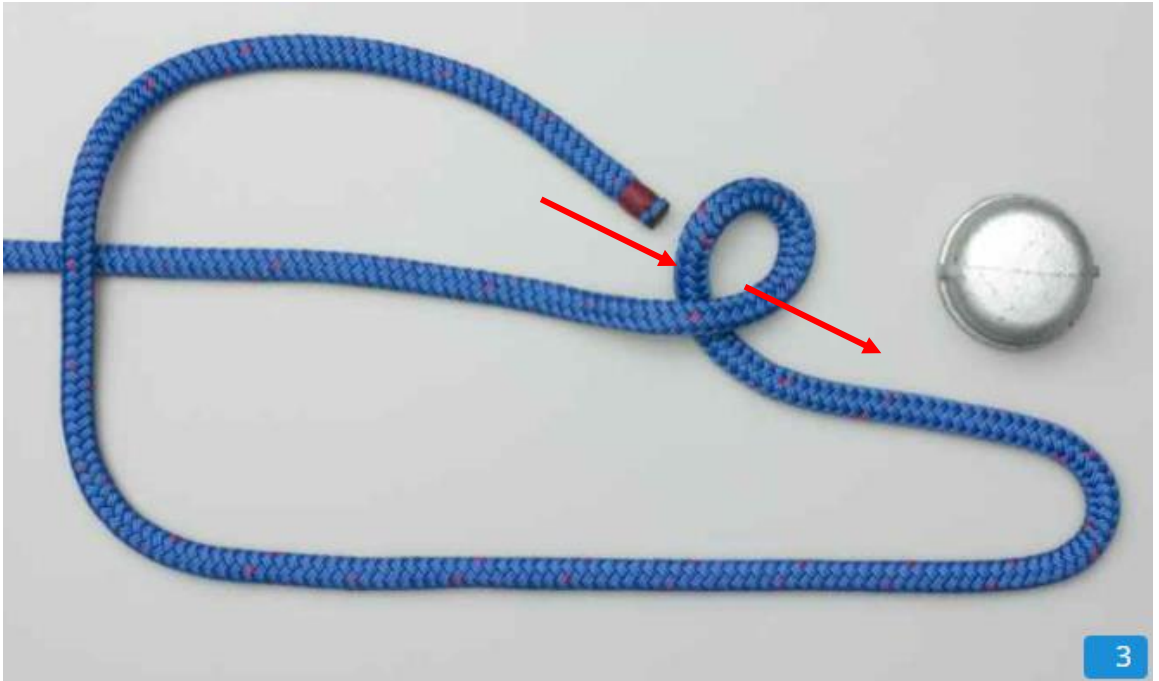
It is also used if a climber is tying into the middle of a climbing rope, as the pull is still only in one direction.

You should be aware that this knot can unroll under relatively low forces if loaded sideways from both directions ie perpendicular to the loop direction, particularly if nothing has been clipped into the loop. In that situation, an [alpine butterfly](#) may be a better choice.

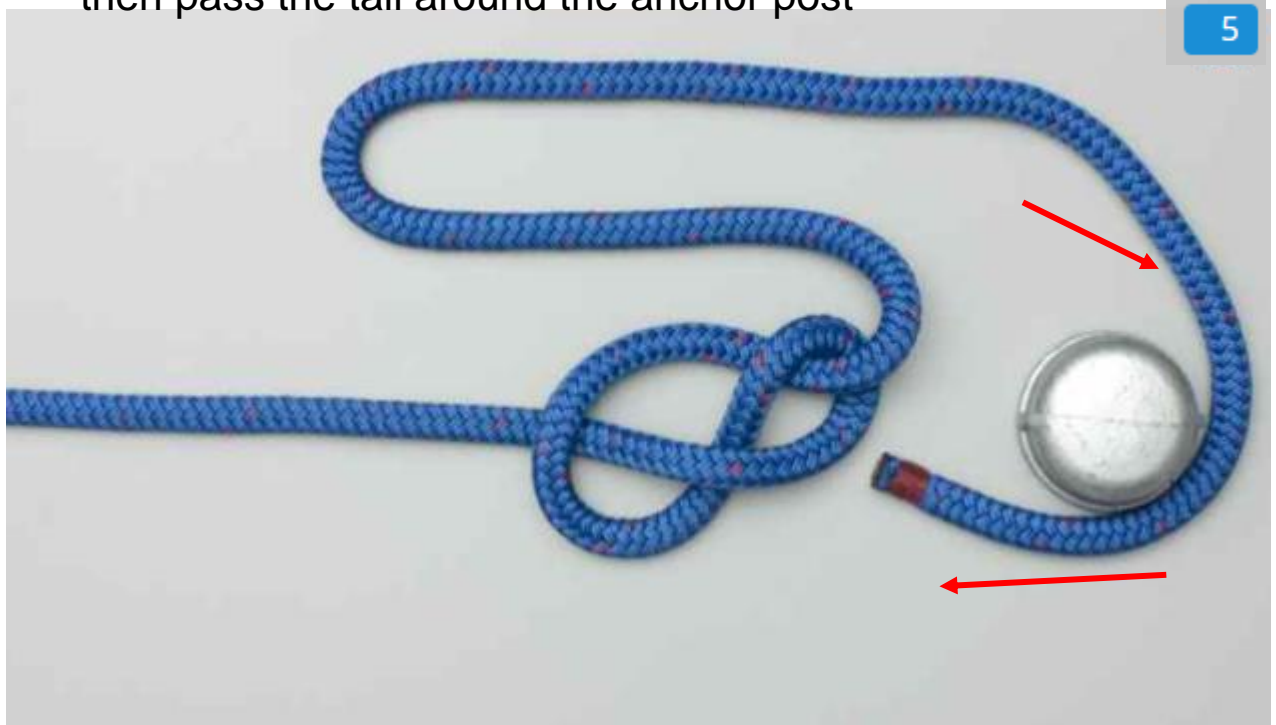
Rethreaded Figure 8 Eye Knot



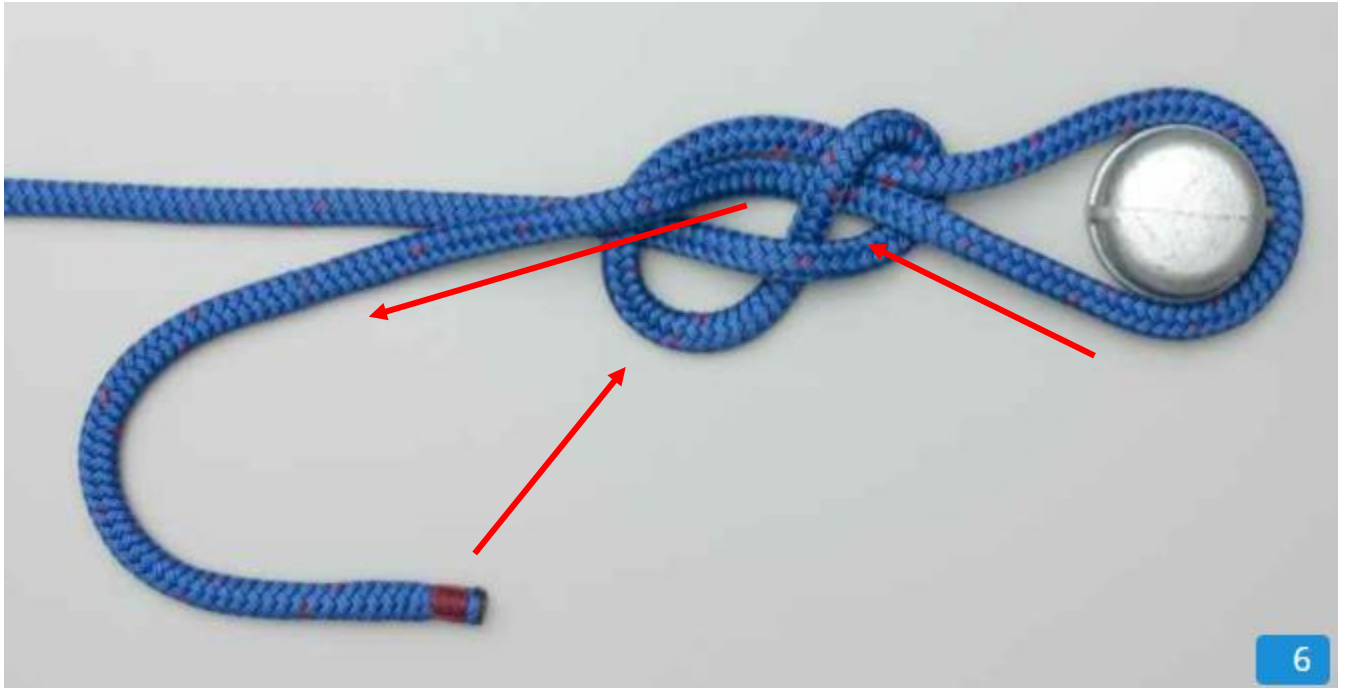
Rethreaded Figure 8 Eye Knot



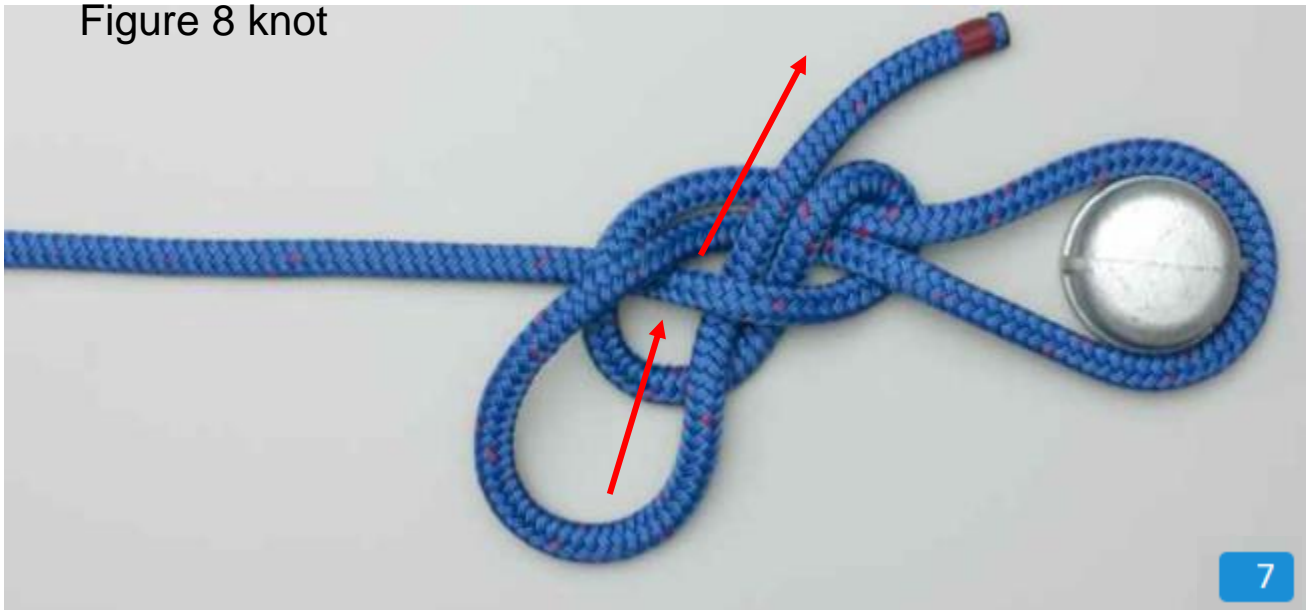
Tie a Figure 8 knot in the rope with a very long tail length, then pass the tail around the anchor post



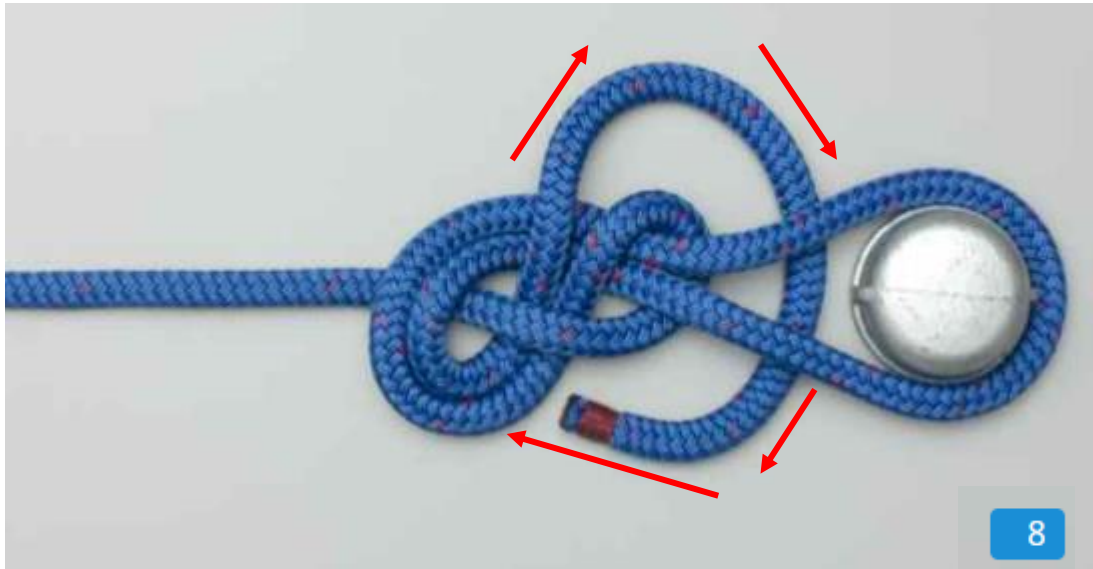
Rethreaded Figure 8 Eye Knot



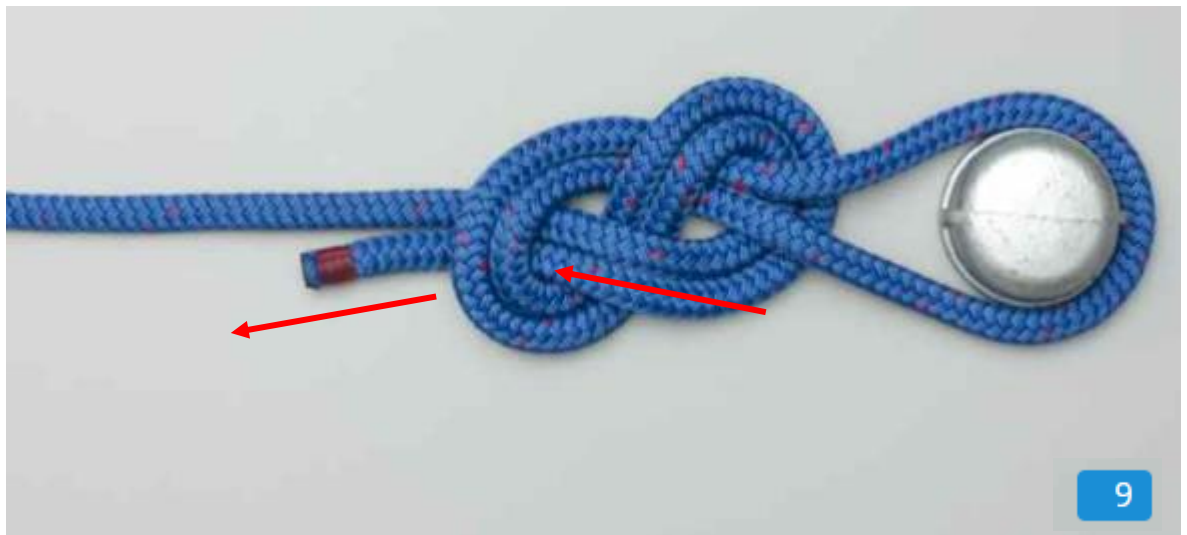
Use the original single strand Figure 8 knot like a road map to trace the long tail of rope through, creating a second Figure 8 knot










Rethreaded Figure 8 Eye Knot



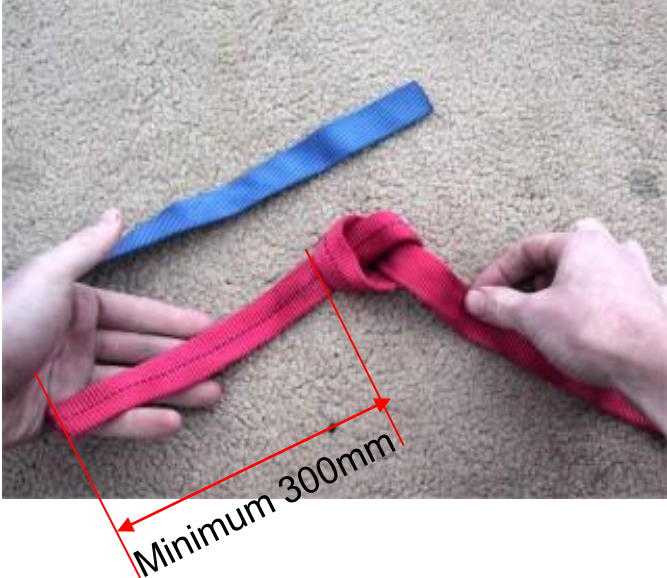

Knot completed & dressed




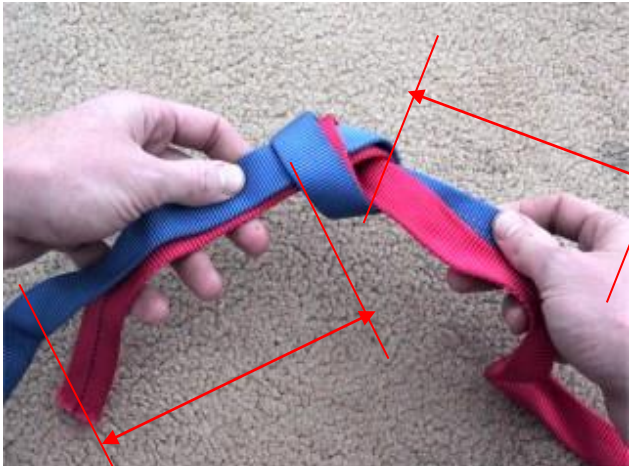

Rethreaded Figure 8 Eye Knot

	<p>The rethreaded figure-of-eight eye knot is an essential knot to know for a couple of applications. It is used around trees or columns in caves for setting up abseil anchors, and it is used by climbers to tie into the end of the rope.</p>	
1 & 2		
3 & 4		
5 & 6		

Tape Knot

1	<p>Start by tying an overhand knot in one piece of tape, usually one end of the same tape, making sure not to introduce any twists.</p> <p>Length of free end tail should be more than 300mm</p>	
2	<p>Starting from the free end (or short tail end), retrace the original knot with the other end of tape or a second piece of tape.</p> <p>The free ends of the tape(s) must finish on opposite sides of the tape knot.</p>	

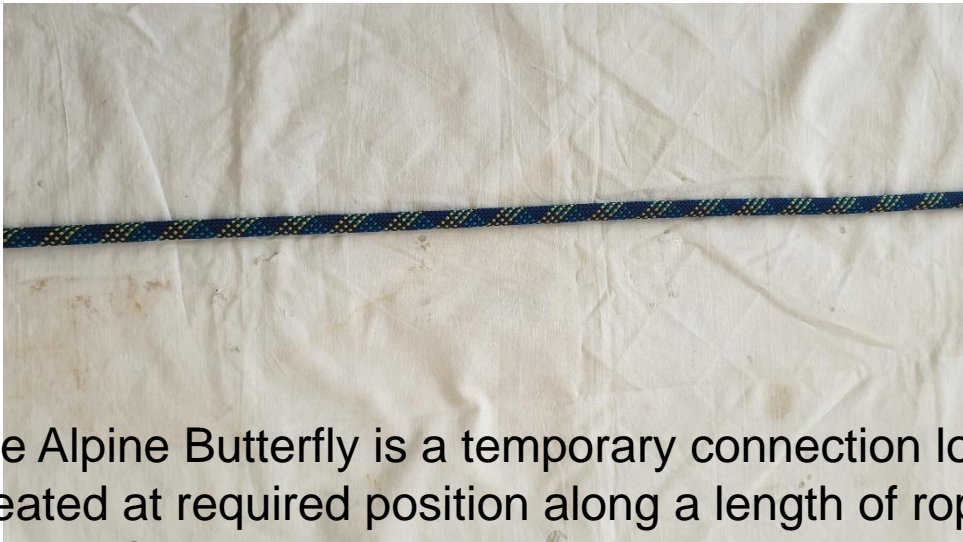
Tape Knot (cont.)

3	Continue retracing...	
4	<p>...until you have retraced the entire knot.</p> <p>Length of free end tail should be more than 300mm</p>	
5	<p>Pull tight and set the knot –</p> <p>see the free ends of the tape(s) are on opposite sides of the tape knot.</p>	

Alpine Butterfly

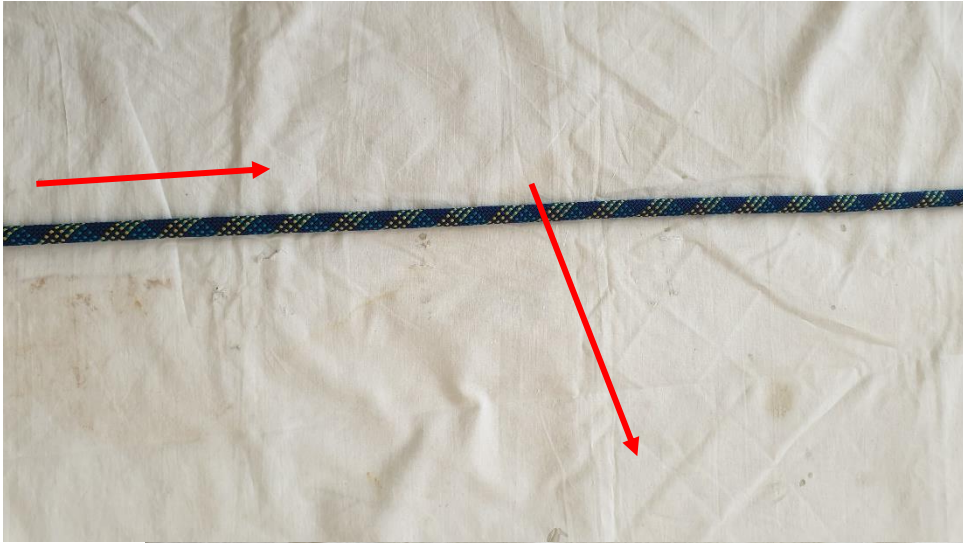


Knot completed & dressed



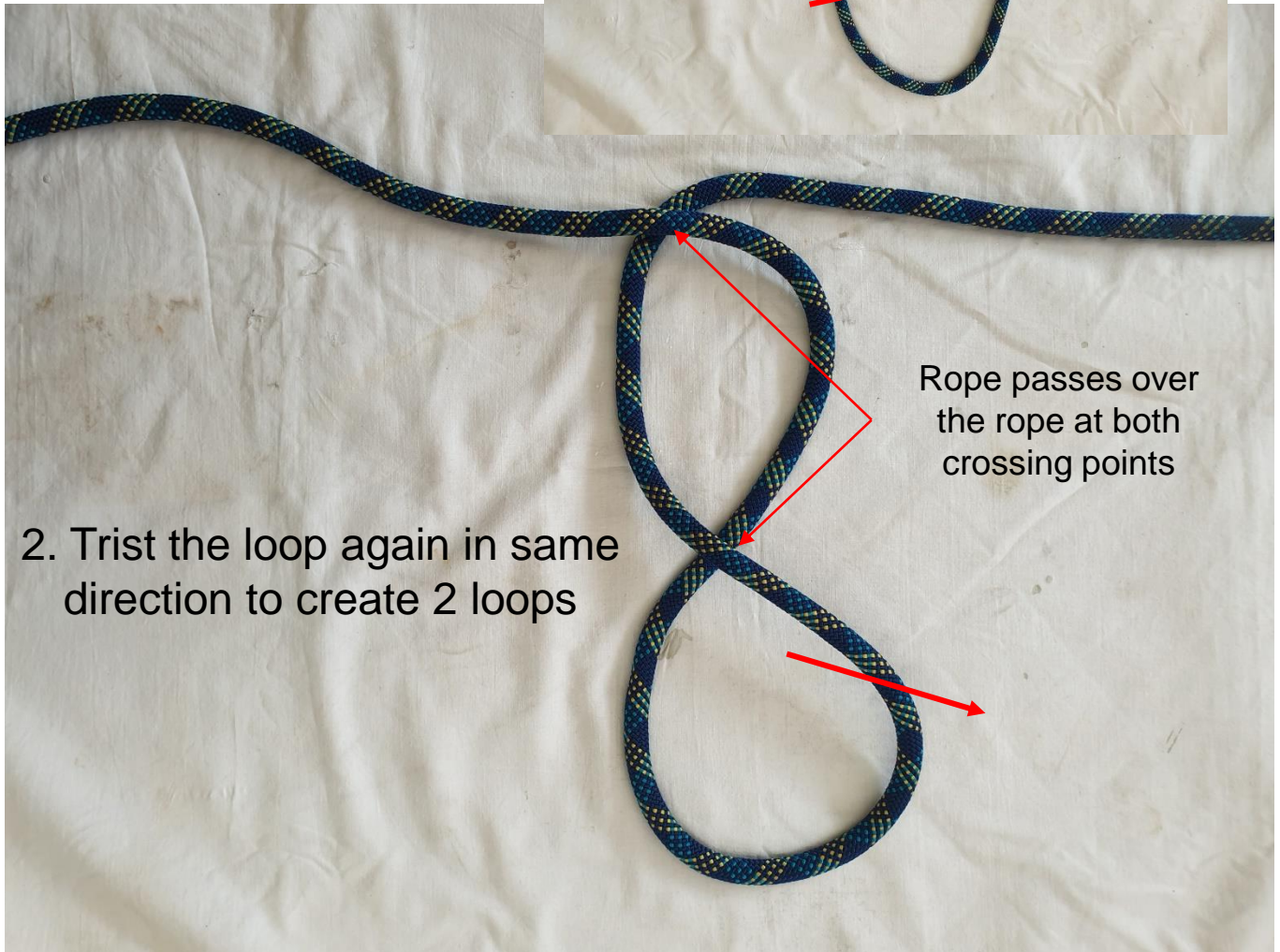
The Alpine Butterfly is a temporary connection loop created at required position along a length of rope.
Start with a straight portion of rope

Alpine Butterfly



1. Create a loop in the rope by bringing one side over & out across the rope

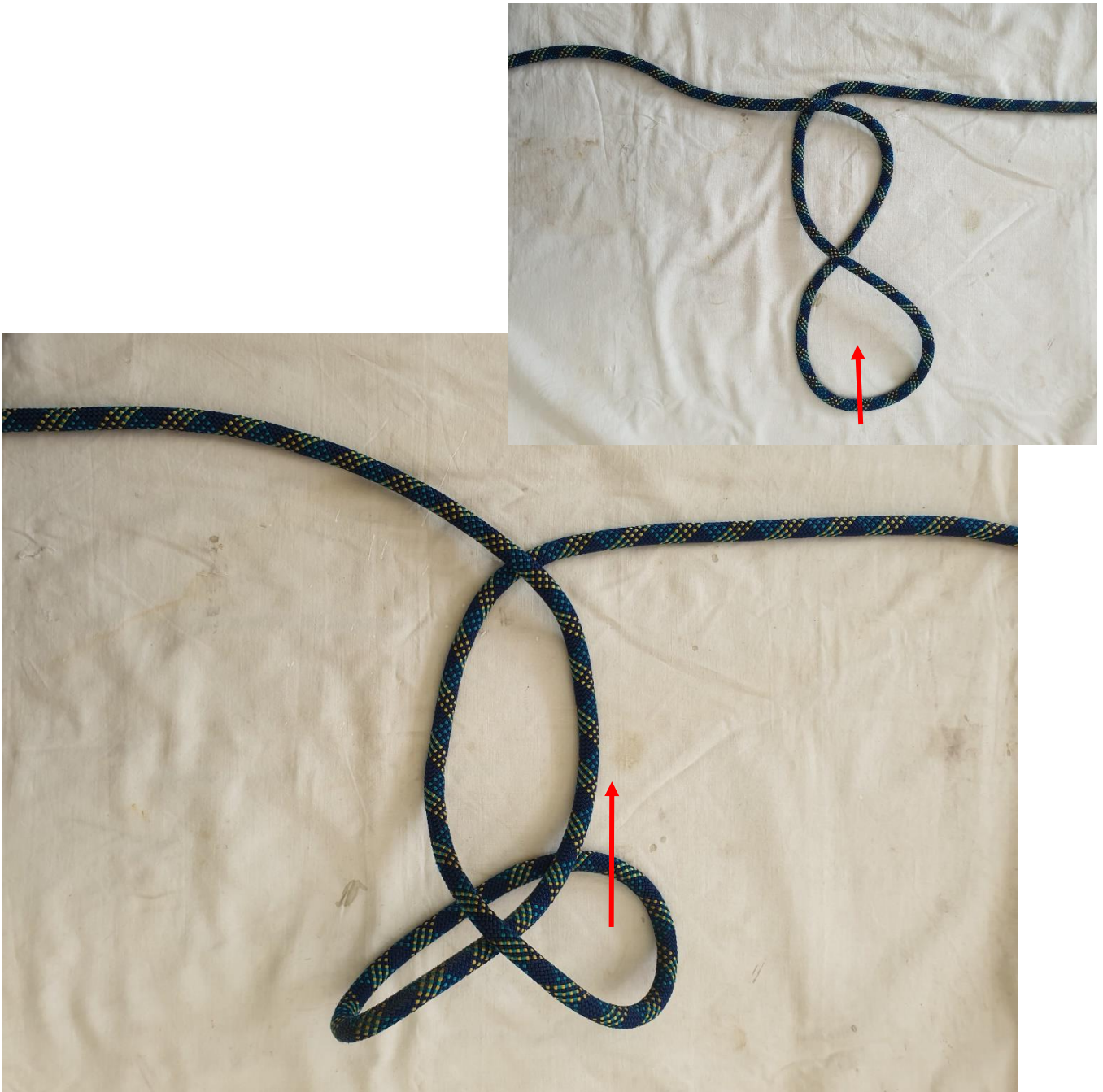
Alpine Butterfly



2. Twist the loop again in same direction to create 2 loops

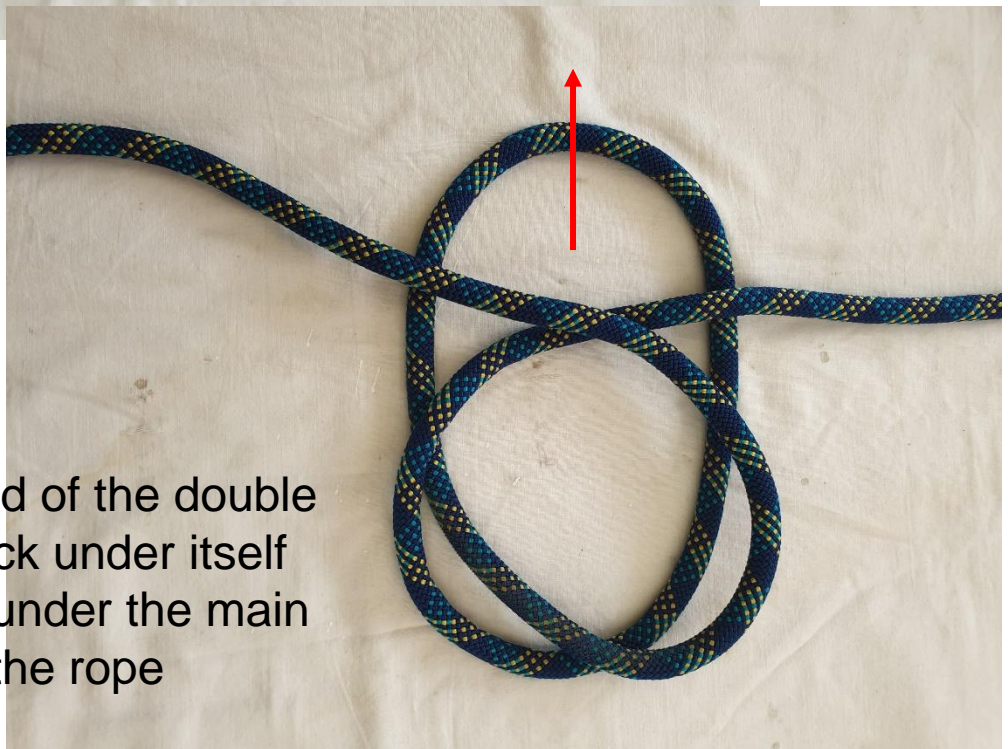
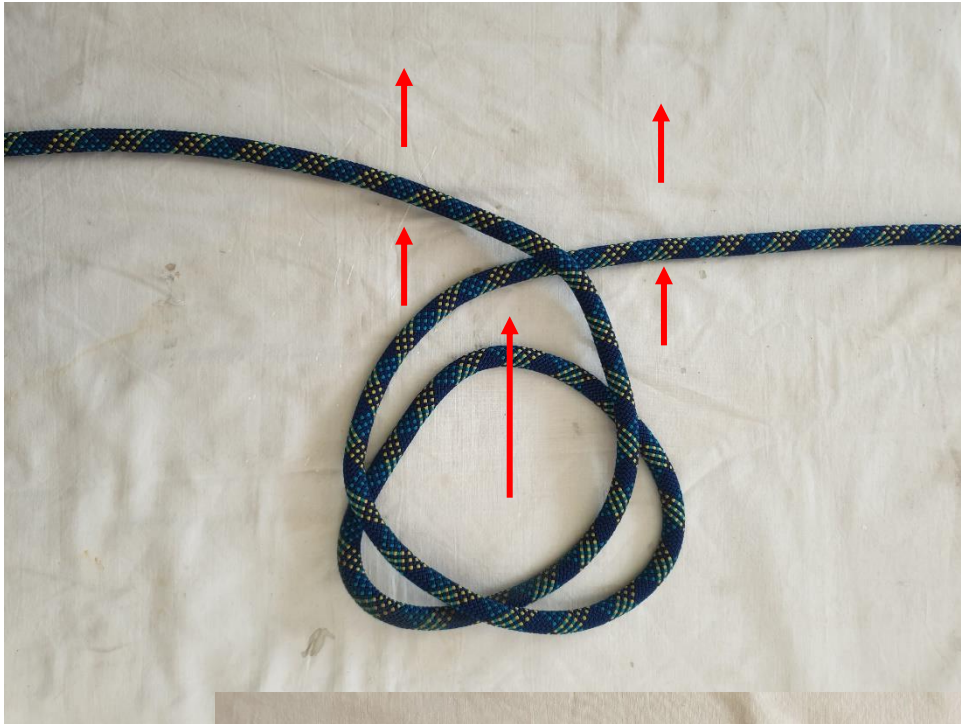
Rope passes over the rope at both crossing points

Alpine Butterfly



3. Pass the end of the double twist loop back under itself toward the main line of the rope

Alpine Butterfly



4. Pass the end of the double twist loop back under itself and continue under the main line of the rope

Alpine Butterfly



5. Pass the end of loop in rope over the main line of rope & back through the double twisted loop in the rope

Alpine Butterfly



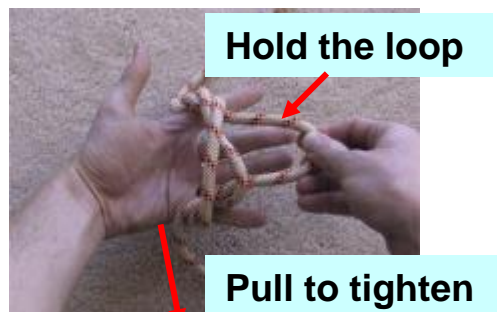
6. Pull the loop out away from the main line of the rope & pull either end of the rope away from knot to correctly form the Alpine Butterfly loop










Alpine Butterfly

The alpine butterfly is a useful knot as it enables a loop to be tied in the middle of the rope.




Note: *when tying this knot on an activity the end of the rope furthest from you will be anchored and by pulling the end closest to you both ends of the rope will tighten*










Alpine Butterfly - 2

1	Create a loop in the rope where you need to create a temporary connection loop	
2	Trist the RH end of loop away from yourself to create the '8' shape loop 	
3	pass the RH end of the '8' loop back under the main line of the rope 	
4	Take the LH end of the loop over the main line of the rope & insert it through the inner loop on the RH side of the main line of the rope 	




Alpine Butterfly – 2 cont.

5	Then pull the loop through to create the new temporary attachment loop	
6	While holding the small attachment loop you have created pull just the portion of the main rope line closest to you to tighten & complete the knot	
	<p>Finished knot.</p> <p>Note: <i>these outside loops are never loaded so knot very easy to undo. This is critical for a knot somewhere well away from either end of a rope.</i></p>	

Alpine Butterfly - 3

	<p>Finished Knot</p> <p>Note: <i>keep the loops around your hand rather loose or the attachment loop created by the knot will be too small to use</i></p>	
1 & 2	<p>Pass rope over your hand</p> 	<p>Repeat along side 1st pass</p> 
3 & 4	<p>And again</p> 	<p>Lift rope closest to thumb over other 2</p> 
5 & 6	<p>Lift the new rope closest to thumb over other 2</p> 	<p>And pass it back through the loops</p> 

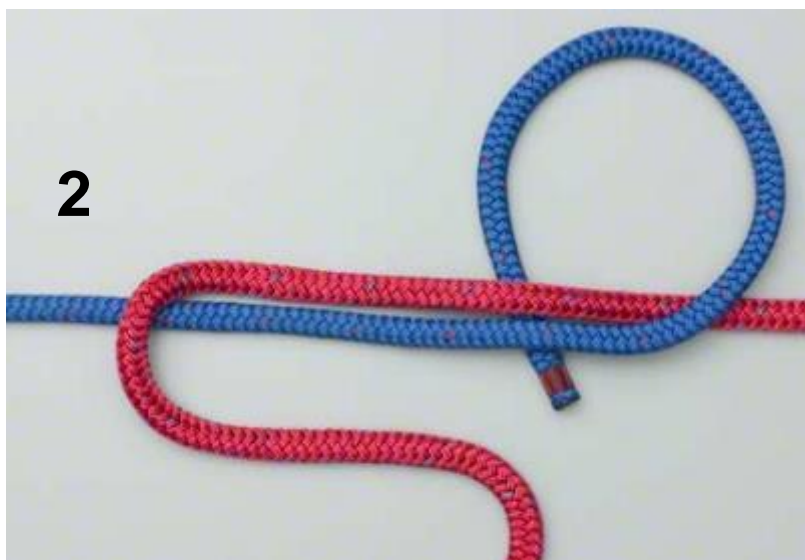
Alpine Butterfly – 3 cont.

7	Then pull the loop through to create the new temporary attachment loop	
8	While holding the small attachment loop you have created pull just the portion of the main rope line closest to you to tighten & complete the knot	
	<p>Finished knot.</p> <p>Note: <i>these outside loops are never loaded so knot very easy to undo. This is critical for a knot somewhere well away from either end of a rope.</i></p>	

Double Fishermans



The Double Fisherman's (Grapevine Bend) is **the** way to join two ends of a line to form a [Prusik Loop](#) and is also an excellent and reliable way of joining two climbing ropes. It can be used for a full rope-length abseil; after which it should still be possible to retrieve the rope.



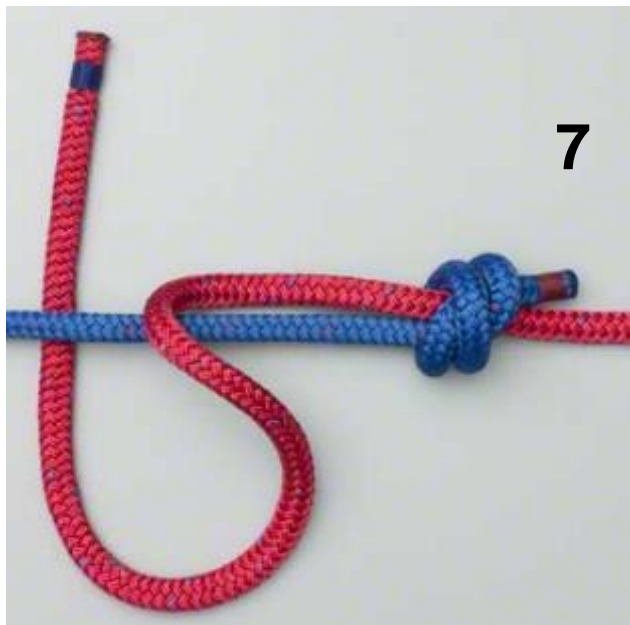
Double Fishermans



Double Fishermans



Leave 2-3 rope diameters as tail beyond knot



Repeat the process with the other rope or rope end.
Note must be done in mirror format to ensure all wraps of the hitch are following parallel to each other

Double Fishermans



Double Fishermans


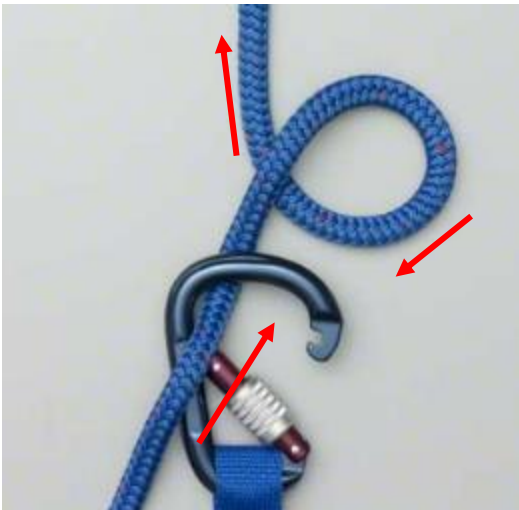

11



12

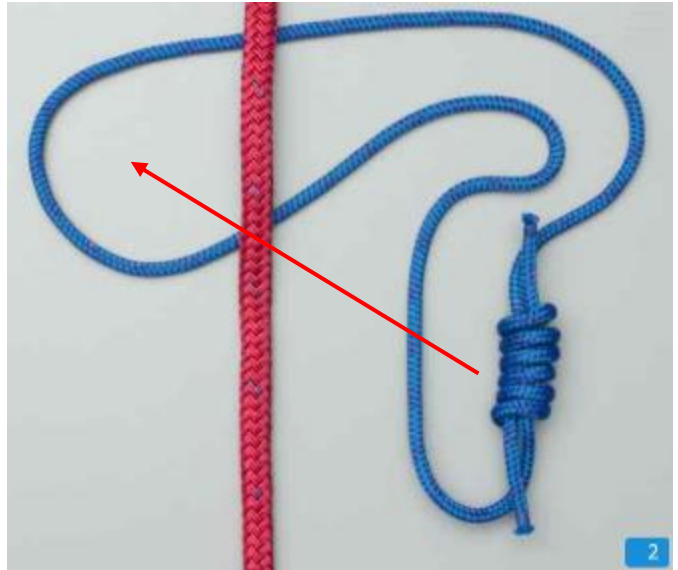


Munter Hitch

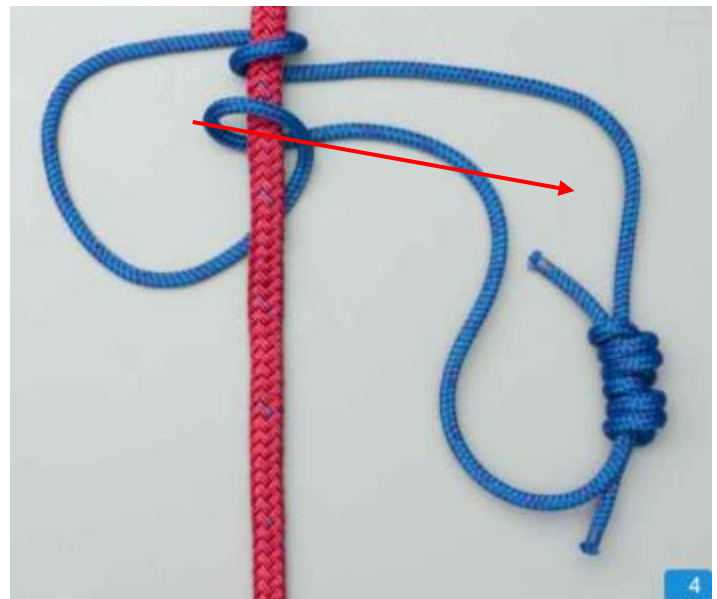
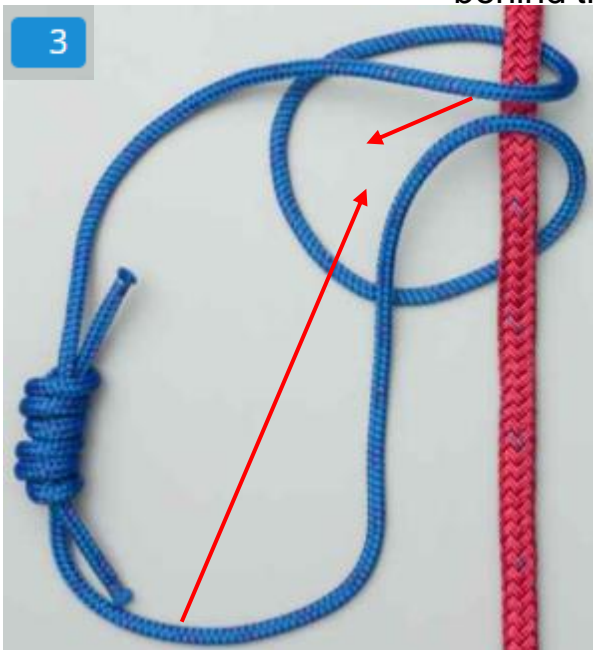
	<p>Tying the Munter Hitch</p> <p>Pass the rope into the karabiner. Twist the rope above into a loop by passing the rope under itself and hook the loop formed onto the karabiner to take the load.</p> <p>Completed hitch</p>	
<p>1 & 2</p>		

Prusik Hitch

Pass the prusik loop behind the climbing rope (red rope) with a short loop to one side



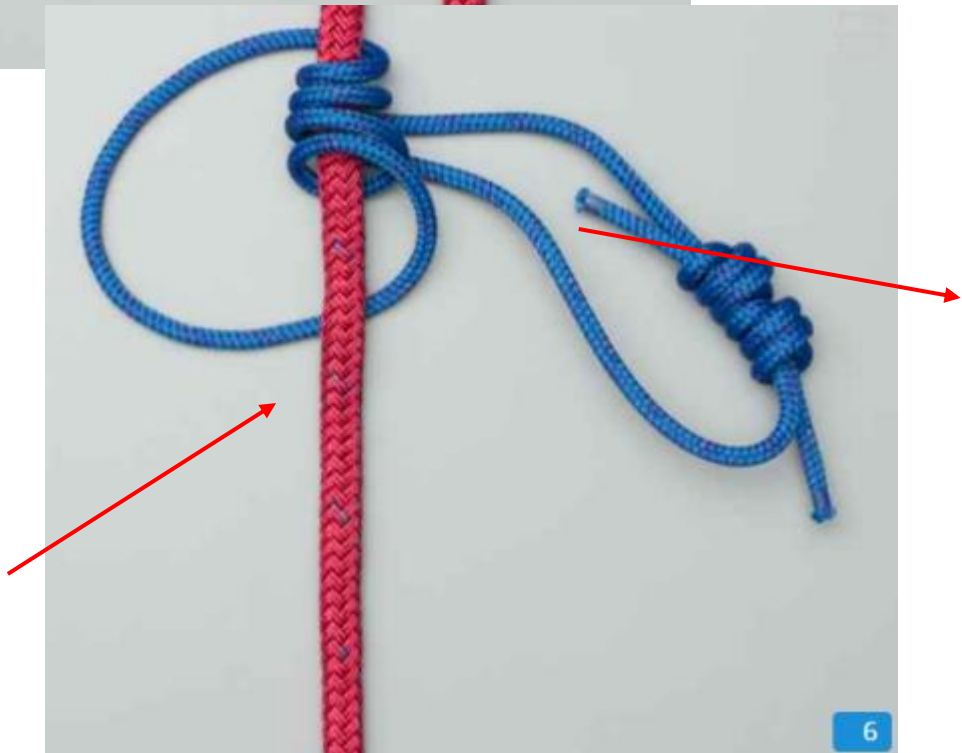
Pass the long end of prusik loop through the short portion loop & back behind the red rope



Prusik Hitch

5

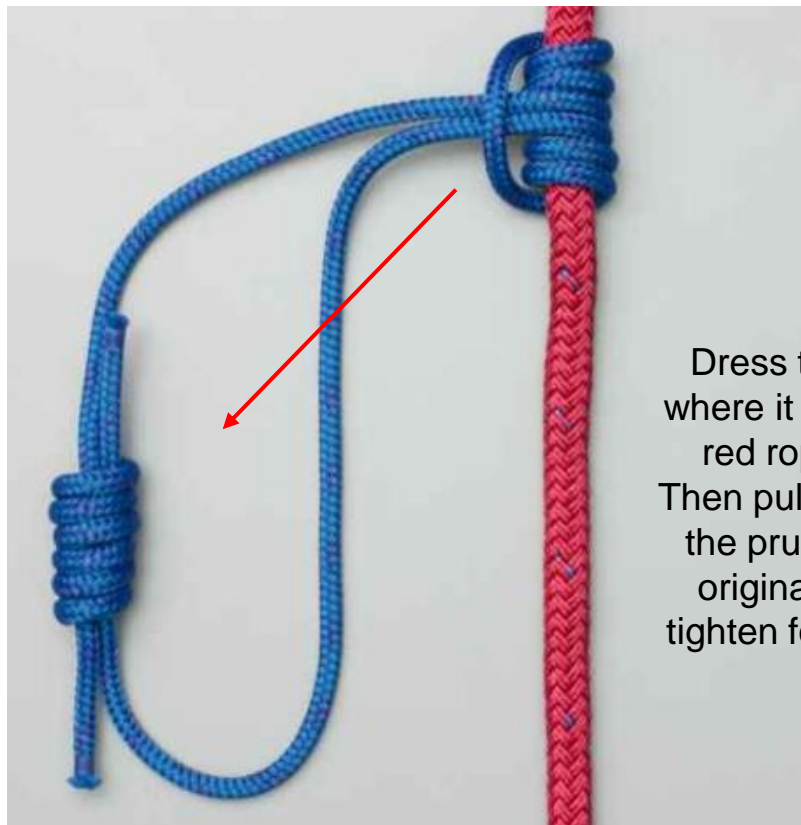
Repeat steps 3 & 4
Pass the long end of prusik loop through the short portion loop, keeping the pass line of the prusik between the previous pass alignment across red rope & then back behind the red rope



Prusik Hitch


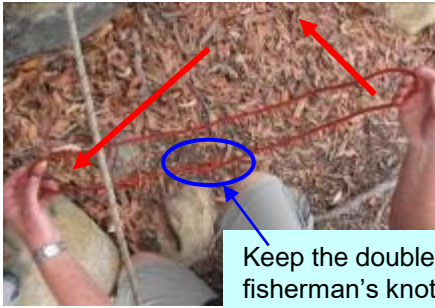







Repeat steps 3
Pass the long end of
prusik loop through the
short portion loop & keep
the pass line of the prusik
between the previous
pass alignment across
red rope





Dress the prusik loop
where it passes over the
red rope, as shown.
Then pull long loop tail of
the prusik through the
original short loop to
tighten forming the hitch

Prusik Hitch – Prussik loop to a rope








		
1 & 2	 	
3 & 4		
5 & 6	 	

Keep the double fisherman's knot away from the prussik knot






Prusik Hitch cont.

7	Manipulate the loops around the rope to eliminate crossovers & twists so the thinner cord of the Prusik loop sits neatly/bites onto the rope.	
8	Completed knot	

Prusik Hitch 2

	<p>Start by placing the Prussik Loop over the main rope, not under.</p>	
1 & 2		
3 & 4		
5 & 6		

Prusik Knot 2 cont.

7			
8			
9	Completed knot		

SIS Training Trained Participant - Extension Module

Additional Knots required for SIS Trained Participant/ Assistant Guide

- Autoblock or French Prussik
- Klemheist
- EDK (Overhand knot - joining 2 ropes)
- EDK (Overhand 1.5 lock)
- VT Prusik
- Clove Hitch
- Munter Hitch with Mule & O'hand lock

*Additional knots that may be of interest/ useful –
outside scope of the mandatory skills req'd:*

- Alpine Butterfly Bend (joining 2 ropes easy release)
- Double Figure 8 Eye Knot
- Load Release Hitch or Radium Release Hitch
- Rosendahl Bend or Zeppelin Hitch
- Double Overhand Noose
- Tensionless Hitch

- **Autoblock of French Prusik**

Difference between Autoblock & Klemheist:

- Autoblock (or French Prusik) captures and connects both ends of the prusik cord in the carabina
- Klemheist connects with the prusik cord via only one end of cord loop (the longer end), after it has been passed through the other end of the cord loop to form the knot.

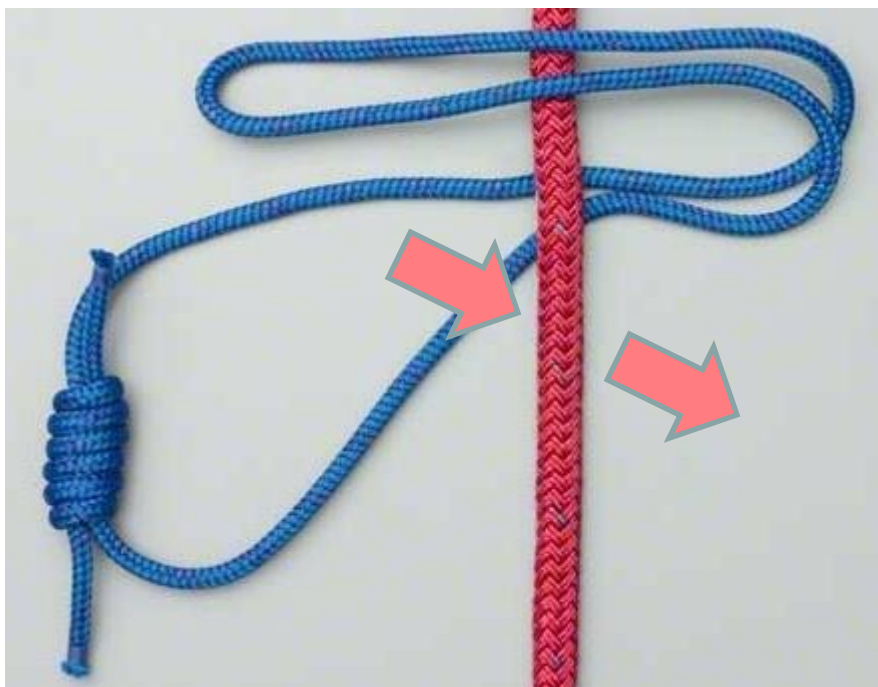


- **Klemheist**

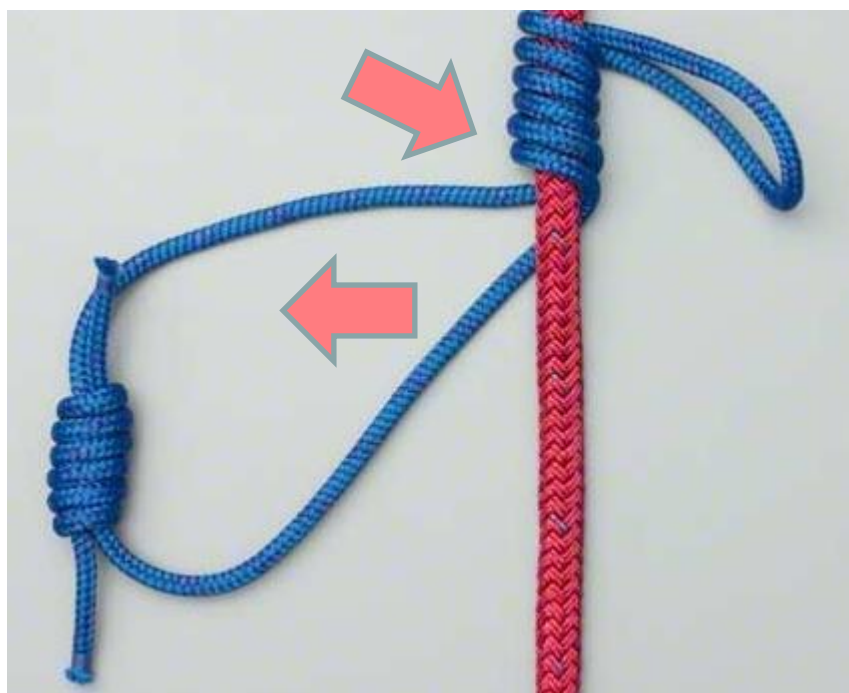
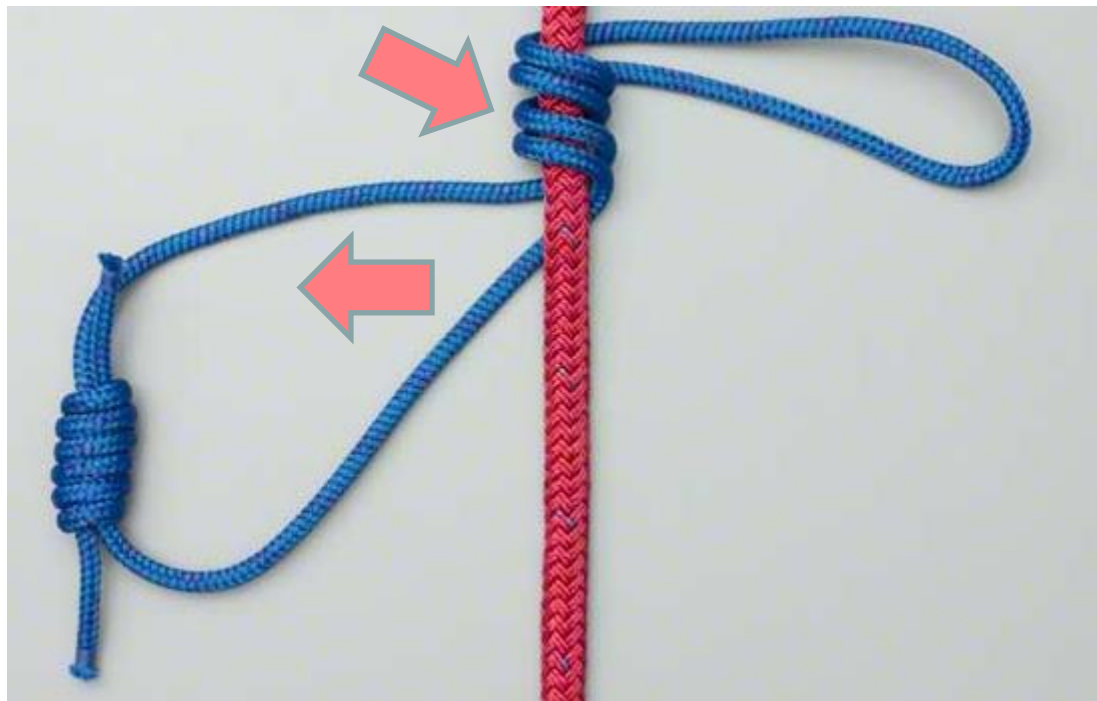


Klemheist (Machard, Knot also called French Prusik in some knotting manuals)

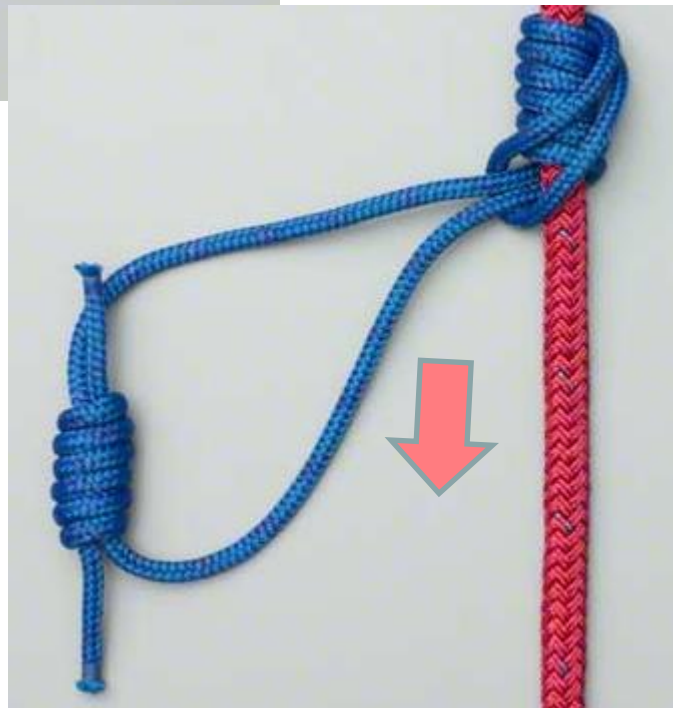
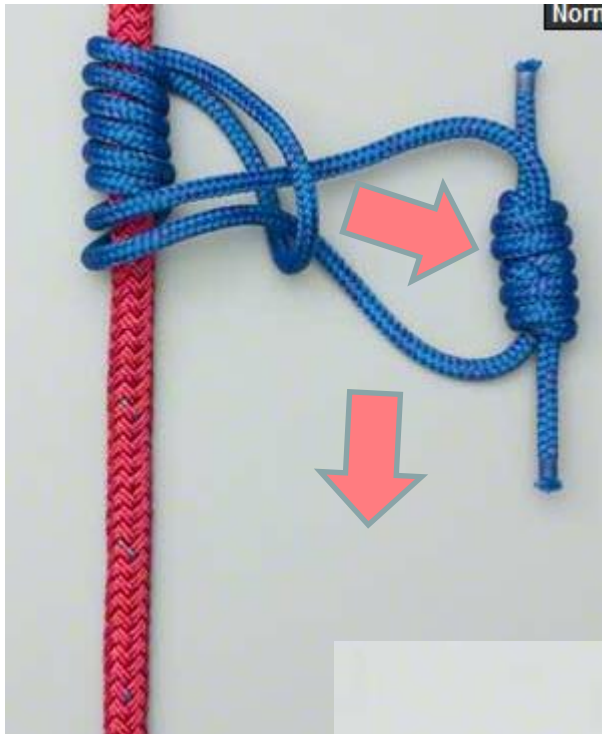
Use a piece of cord formed into a loop. Pass the loop around the main rope. Make three complete turns, laying each turn on neatly. Pass the rest of the cord through the loop and pull it back down in the direction of the expected load.



- **French Prusik**



- French Prusik



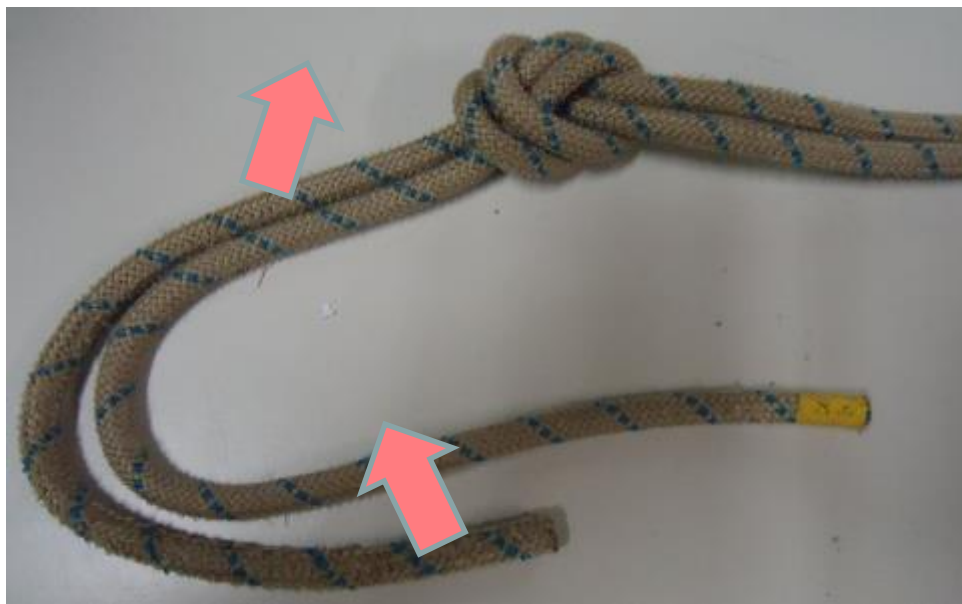
- **EDK (European Overhand Knot)**



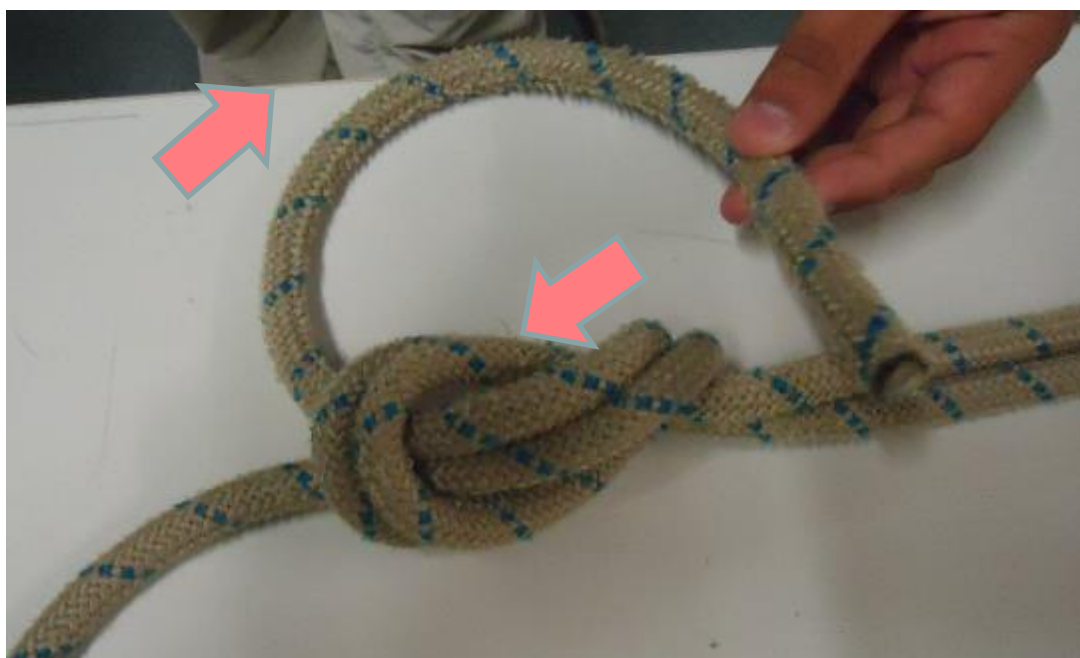
- **EDK Overhand 1.5 (European Overhand Knot)**



- **EDK Overhand 1.5 (European Overhand Knot)**



After tying the EDK, take one of the end pieces and rethread it through the overhand knot



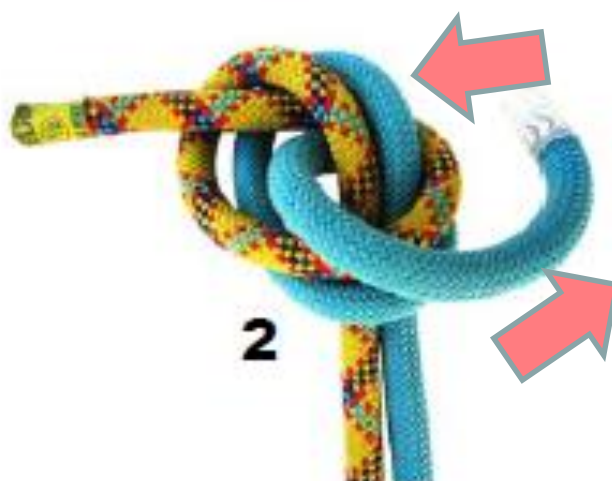
- **EDK Overhand 1.5 (European Overhand Knot)**



Pull end through the knot and dress to achieve full contact of the strands of rope, then pull tight

- **EDK Overhand 1.5 (European Overhand Knot)**

Also known as the Offset Bound Overhand Bend (PACI)

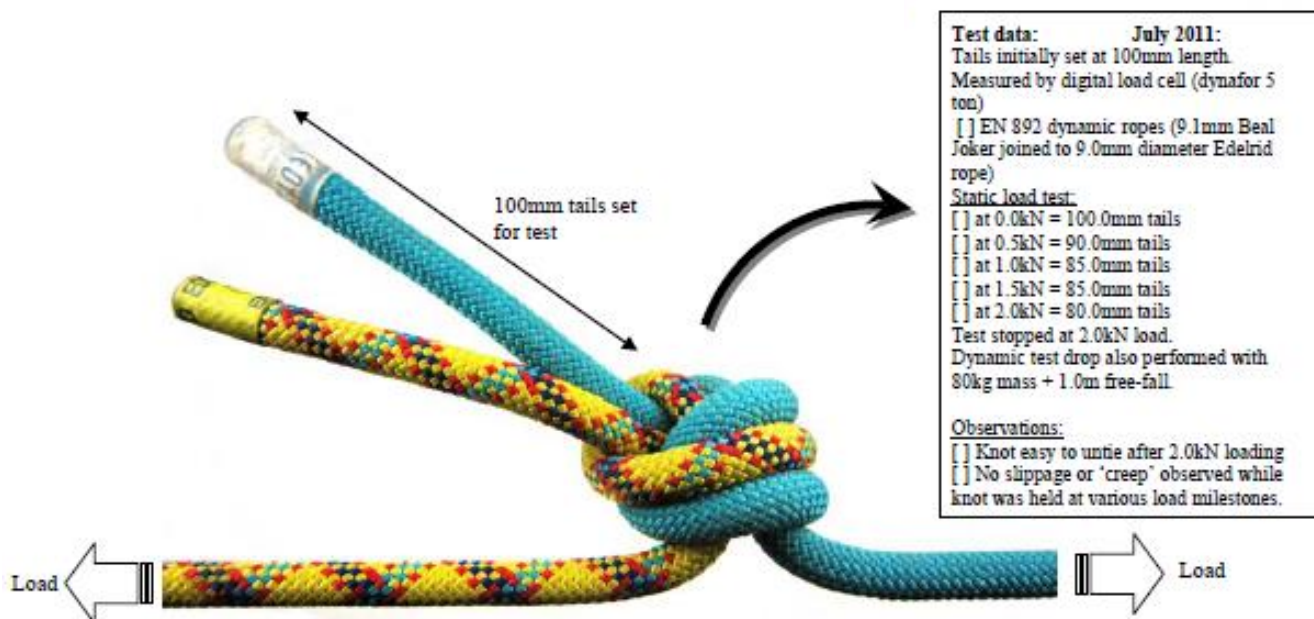


NOTE: Set tails at *minimum* of 200mm when using this knot for human life support

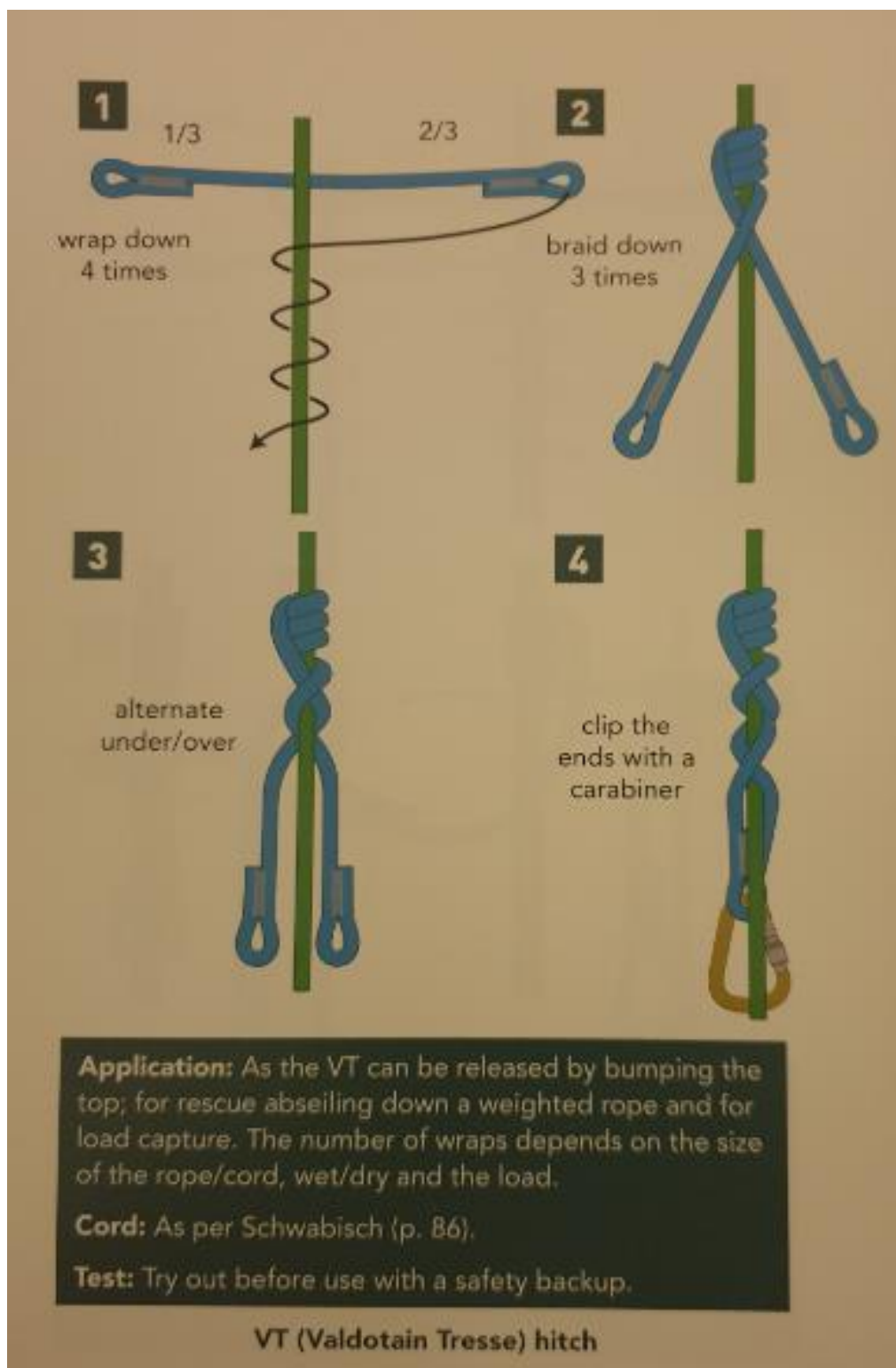


- **EDK Overhand 1.5 (European Overhand Knot)**

Also known as the Offset Bound Overhand Bend (PACI)



- **VT Prusik (Valdotain Tresse)**



- **VT Prusik**



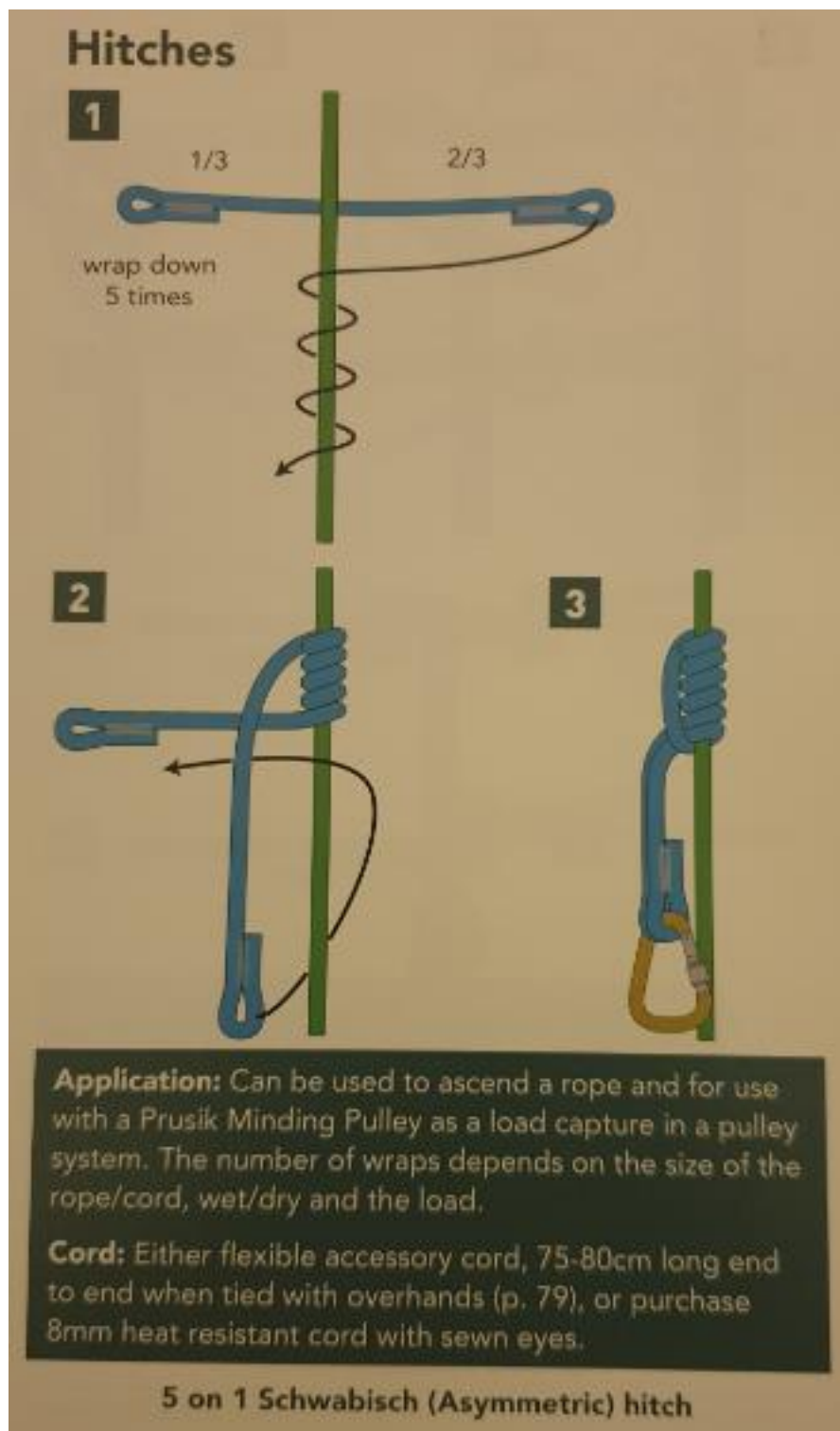
The **Valdotaian Tresse** starts with several turns at the top followed by a lacing or braid below (tresse is French for 'braid').

There are several variations depending on the number of turns at the top and the number of lacing turns.

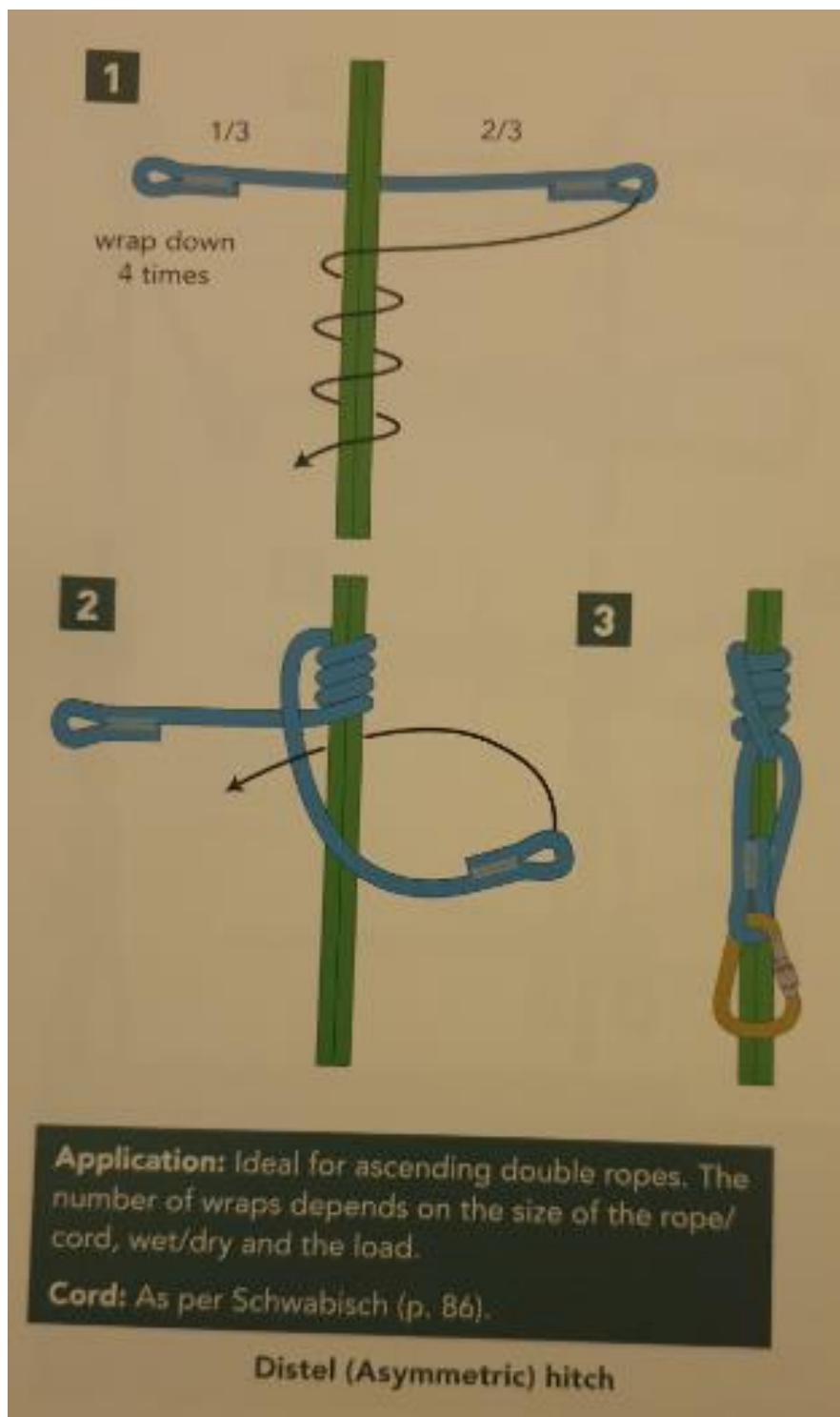
The Valdotaian Tresse XT is similar to the Valdotaian Tresse but after the turns at the top, the two ends cross over each other ("X") to reverse direction.



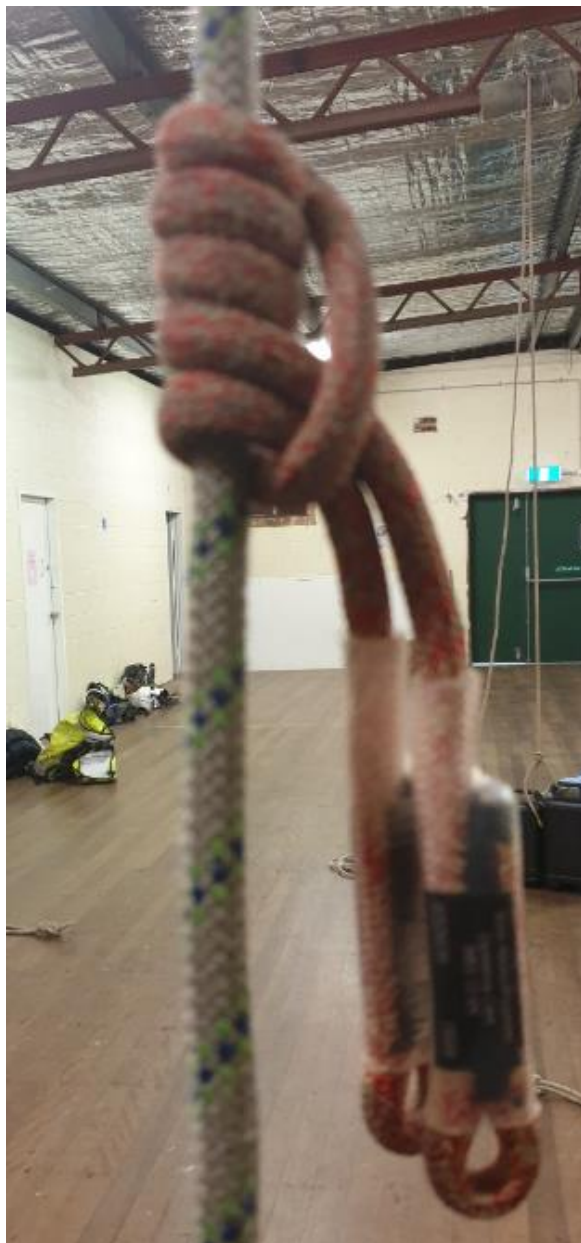
- **Similar to VT Prussic – form of French Prussic**



- **Distel (Asymmetric) Hitch**



- **VT Prusik – tied as a prussic hitch**

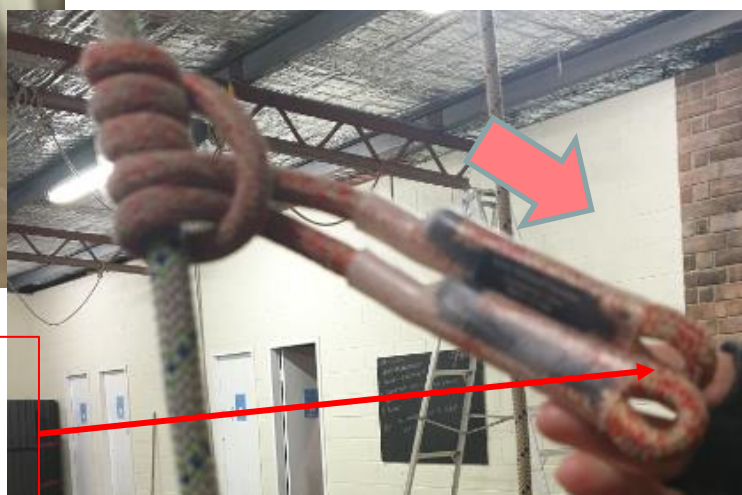


Completed hitch & loaded



CRITICAL to achieve both ends of VT cord at same length at end of tying

- **VT Prusik – tied as a prussic hitch**



CRITICAL to achieve both ends of VT cord at same length at end of tying

- **Clove Hitch**



- **Clove Hitch**



- **Clove Hitch**



- **Clove Hitch**



- **Clove Hitch**

Alternate method



- **Clove Hitch**

Alternate method



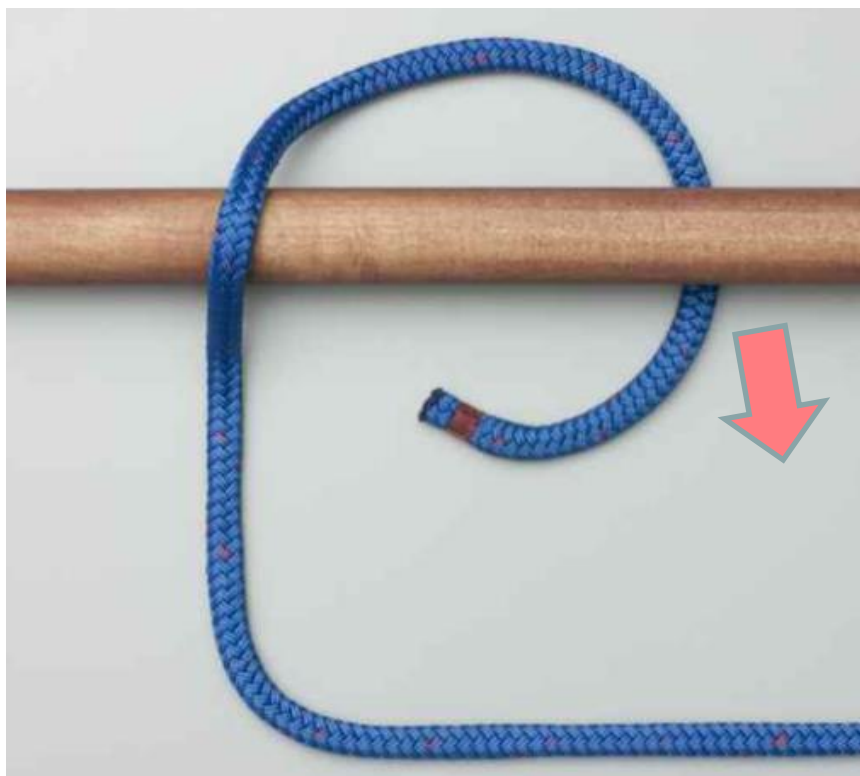
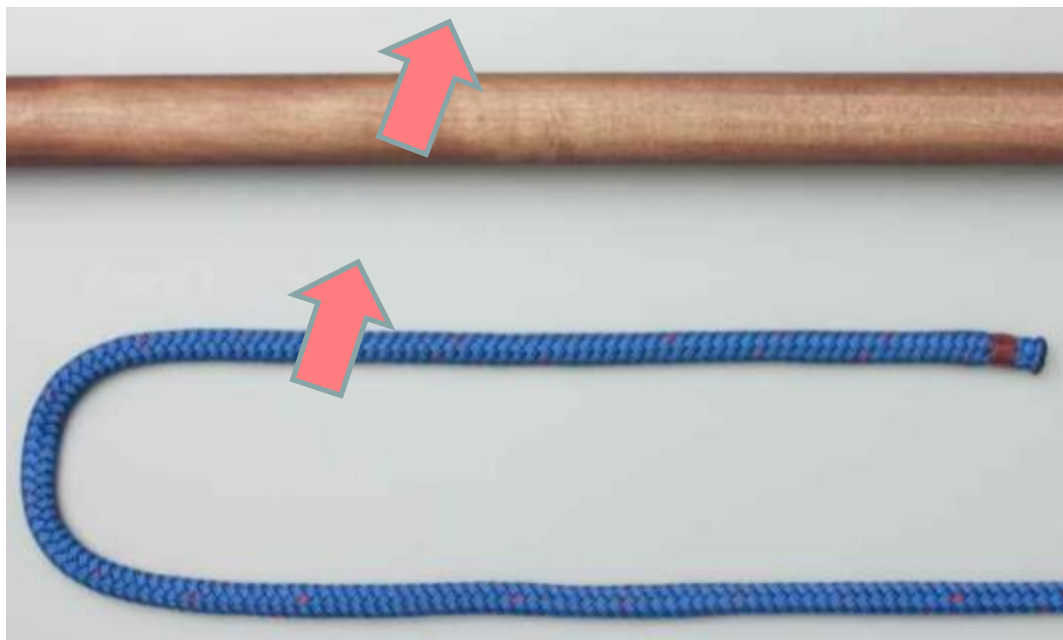
- **Clove Hitch**

Alternate method



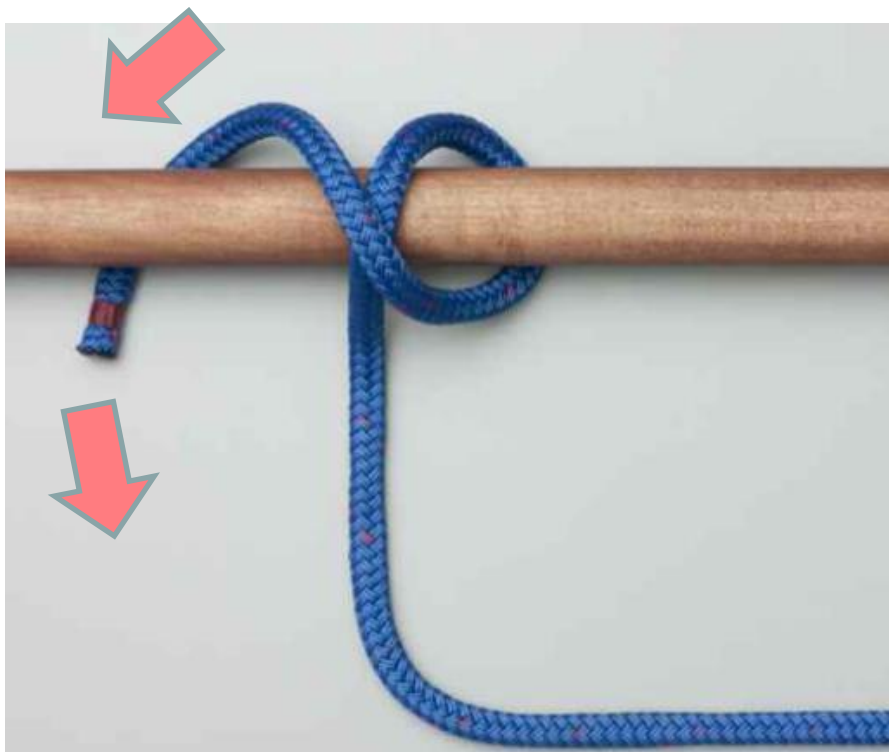
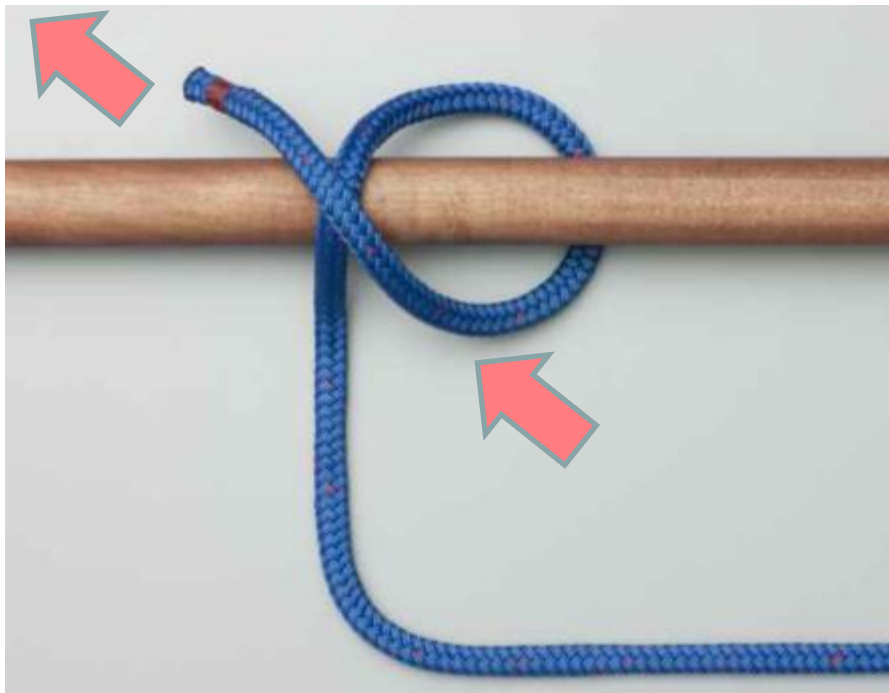
- **Clove Hitch**

Alternate method



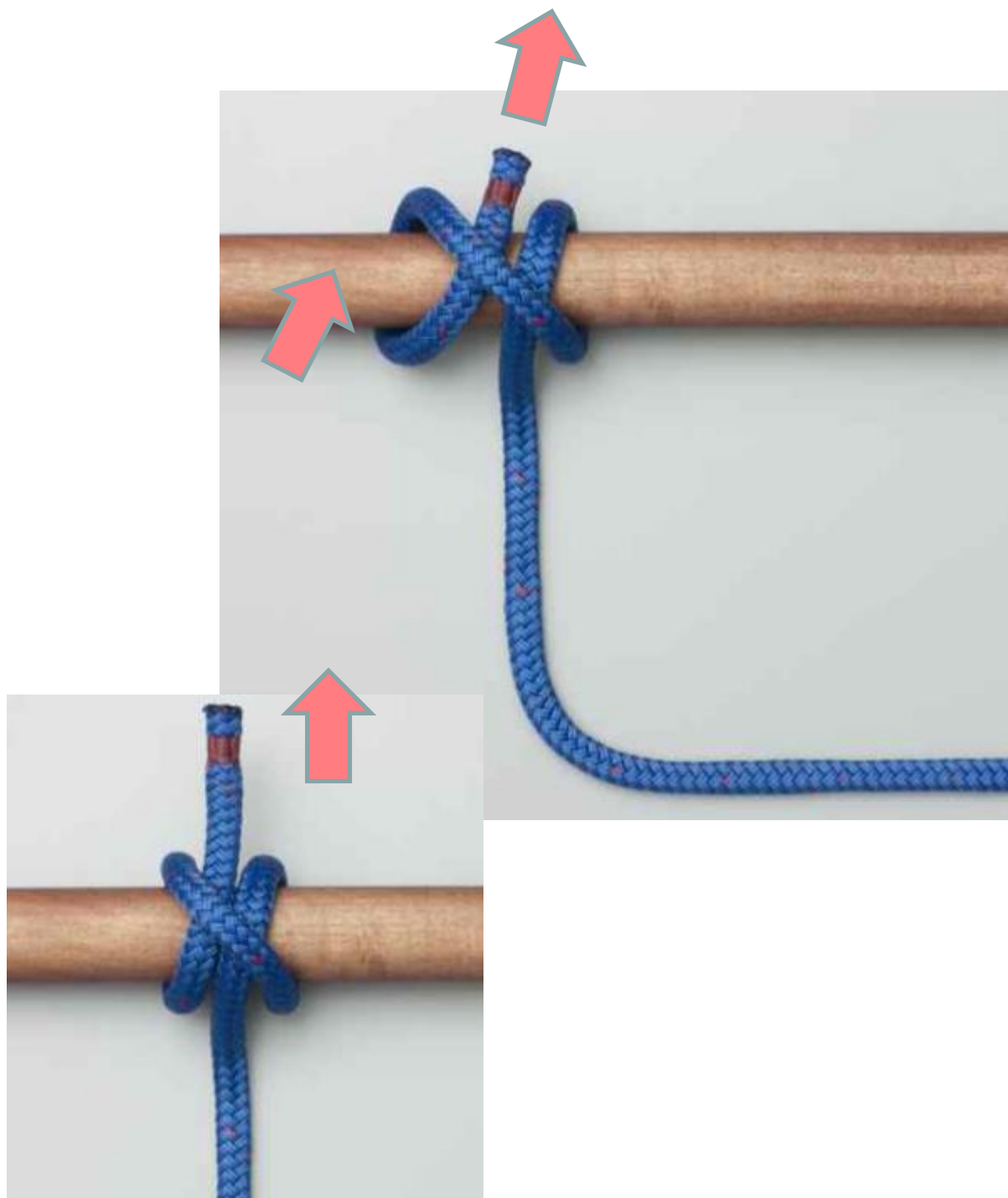
- **Clove Hitch**

Alternate method



- **Clove Hitch**

Alternate method



- **Munter Hitch** (repeat from SP Knot section)

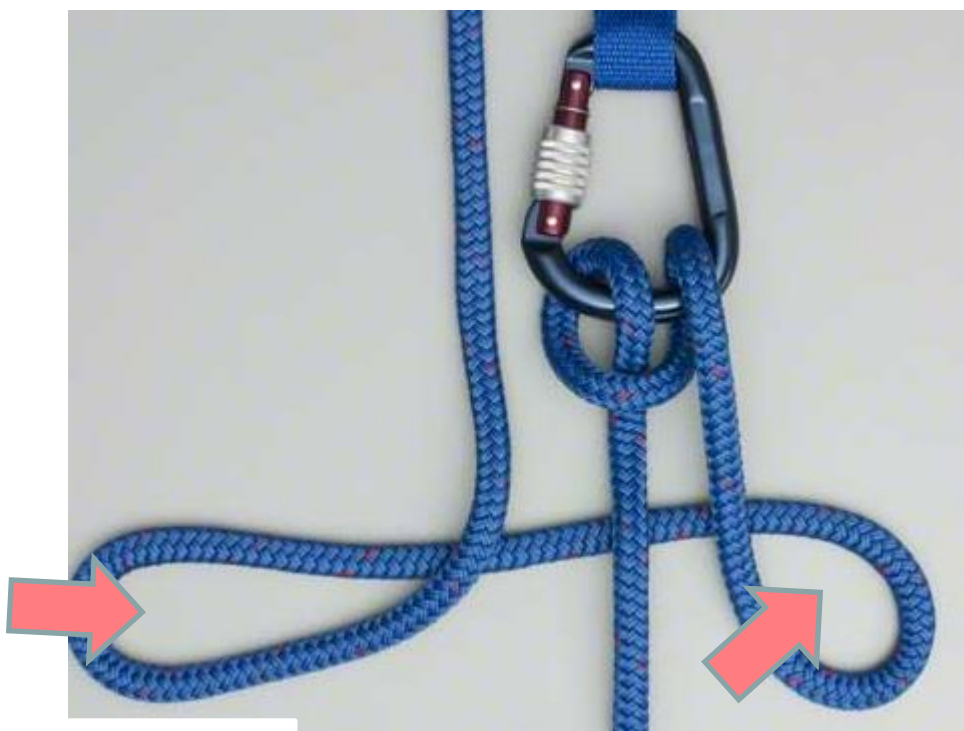


Munter Mule Combination Hitch Tying

Pass the rope into the carabiner. Twist the rope above into a loop and hook it onto the carabiner to take the load. Create two loops and then, around the climbing rope, tie a slip knot leaving a long loop. Use it to tie a Half Hitch to secure the knot.



- **Munter Hitch plus Mule & overhand (tie-off)**



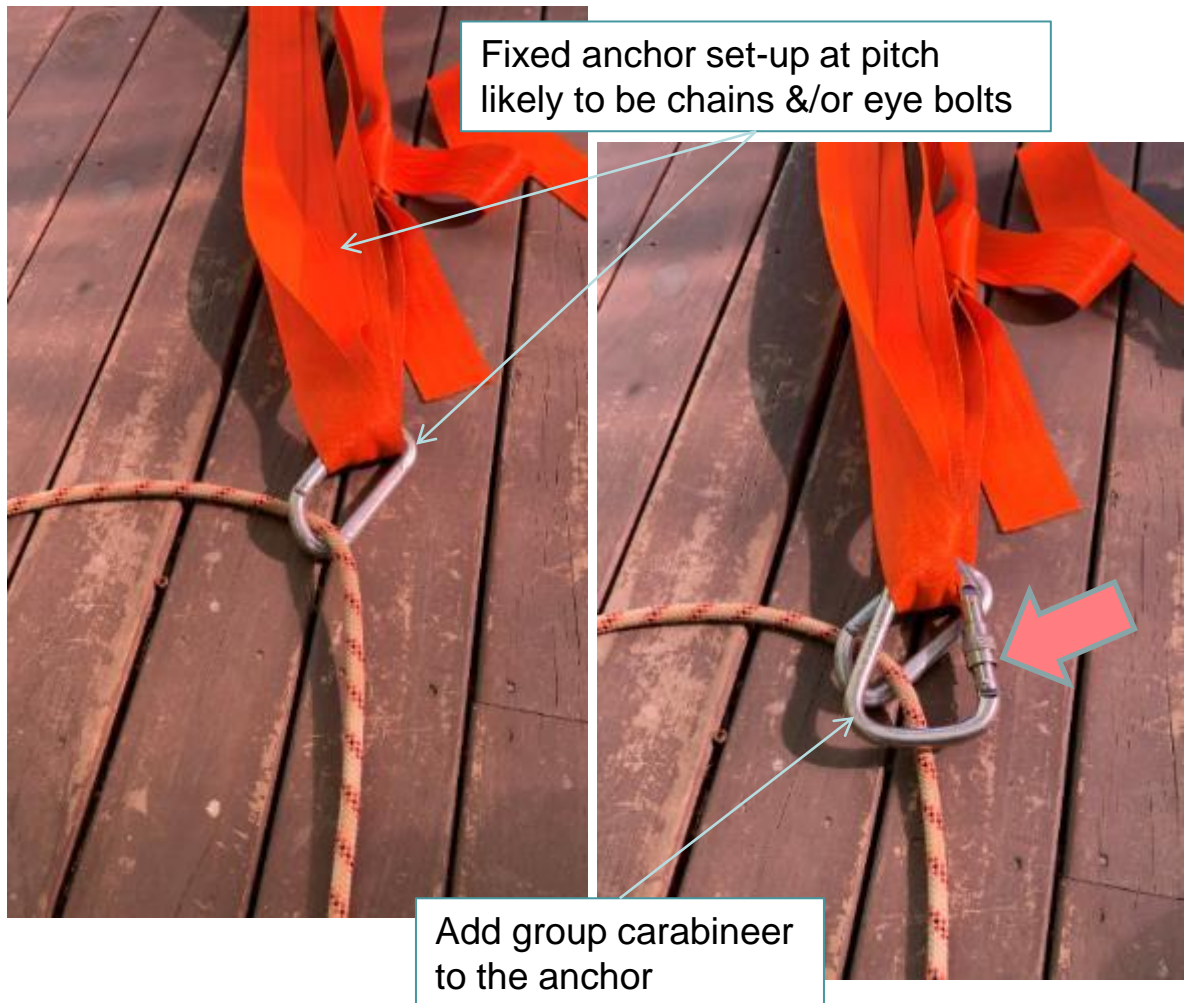
- **Munter Hitch plus Mule & overhand (tie-off)**



- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

1. Tie the Munter hitch
2. Tie the mule to lock the Munter
3. Add the overhand knot as safety back-up to prevent mule accidentally coming undone
+ anchor tail of overhand loop to prevent it being caught up in other activity at the anchor point



- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

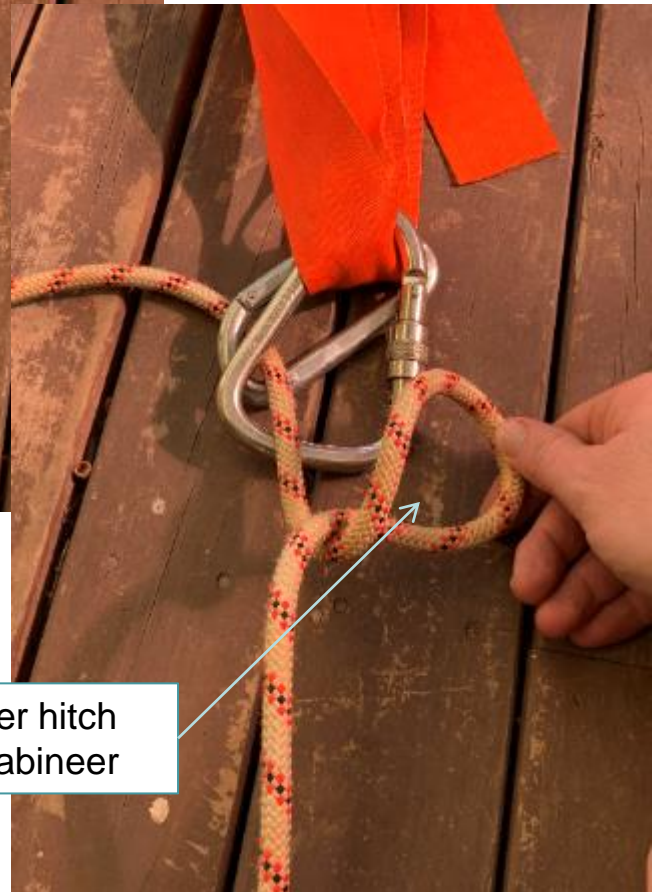
This is a 3 step process:

1. Tie the Munter hitch



Pass your rope through
your added carabineer

Abseil rope
– over cliff face

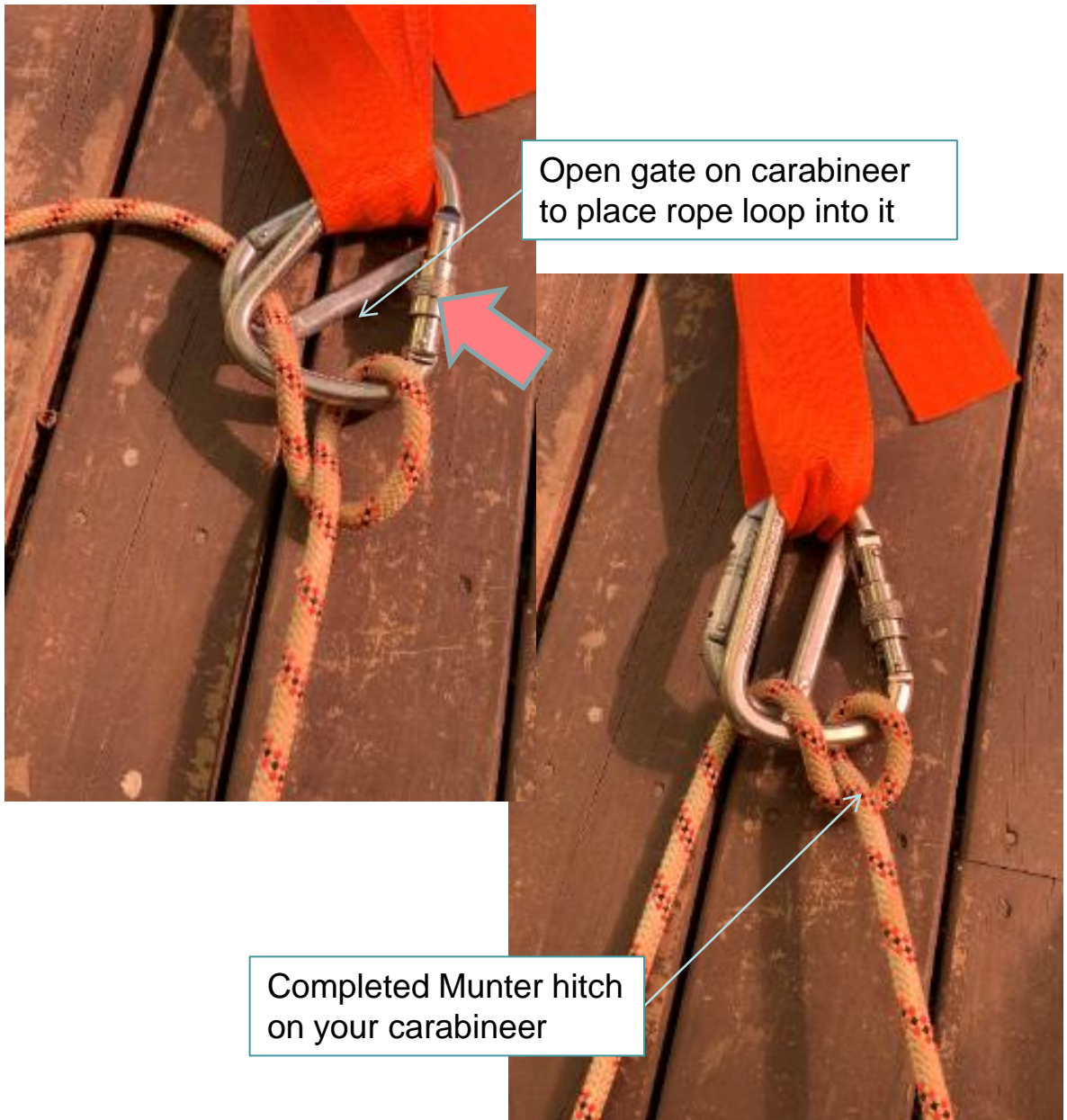


Tie the Munter hitch
into your carabineer

- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

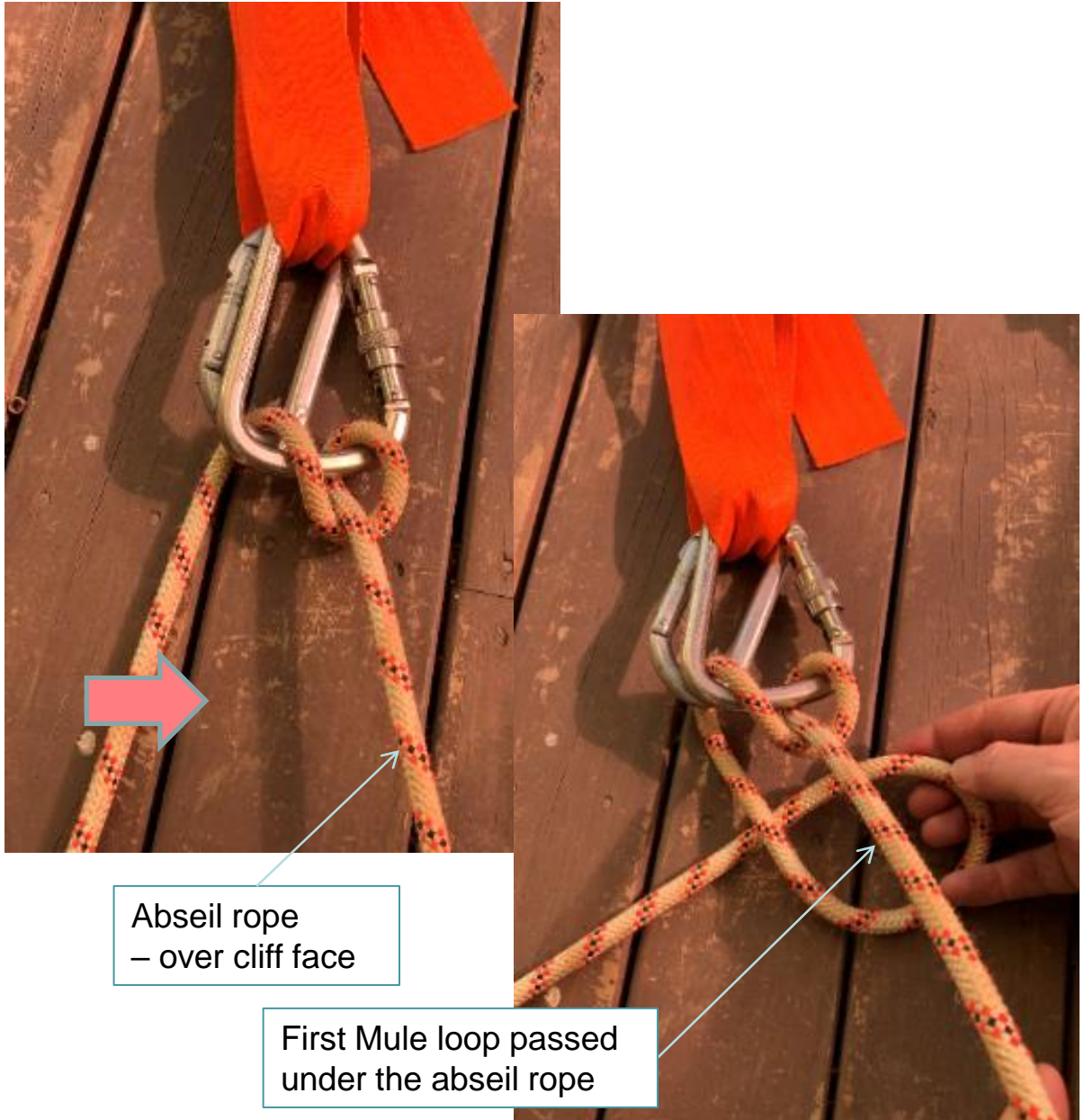
1. Tie the Munter hitch



- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

2. Tie the mule to lock the Munter



- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

2. Tie the mule to lock the Munter

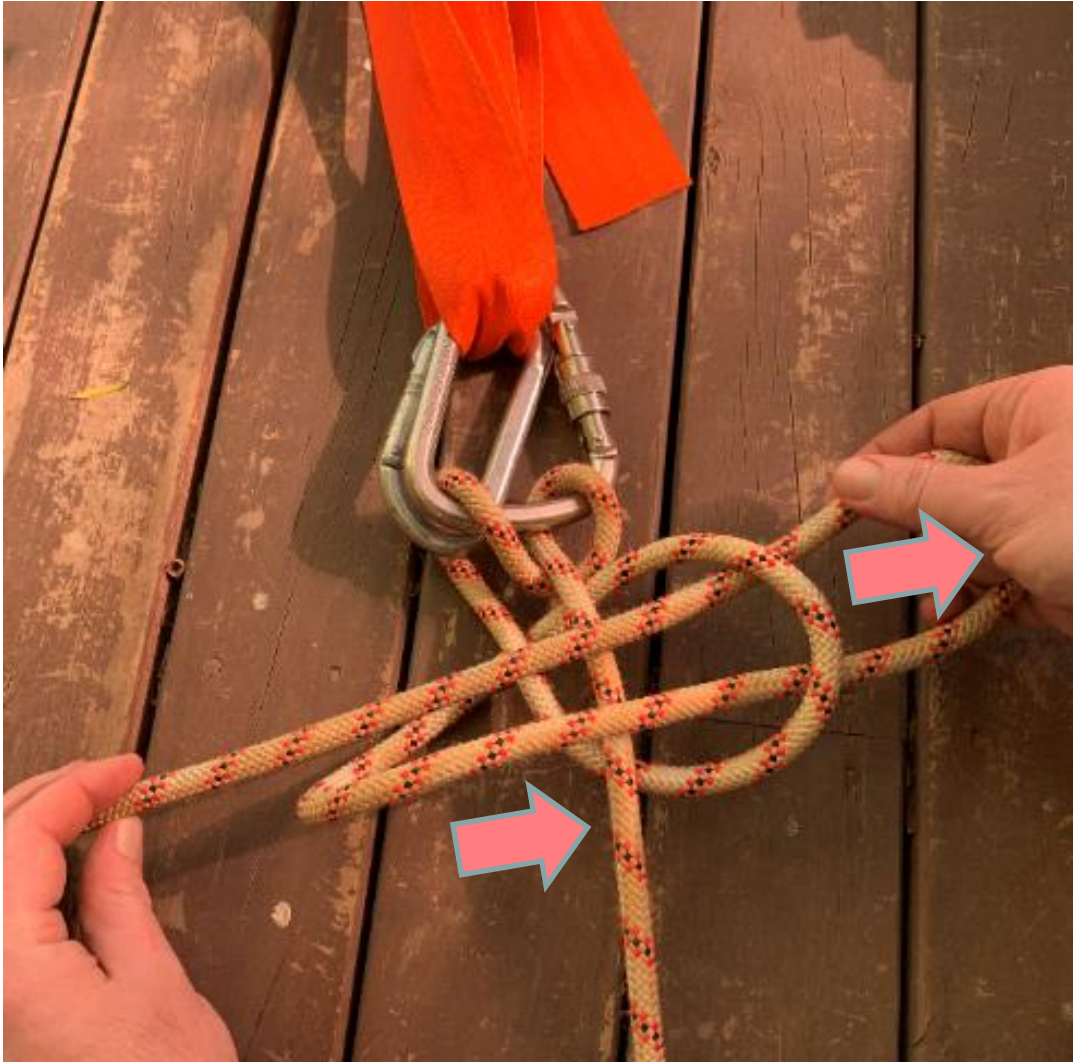


Form 2nd mule loop in rope tail to pass over abseil rope & through the 1st Mule loop

- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

2. Tie the mule to lock the Munter



- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

2. Tie the mule to lock the Munter

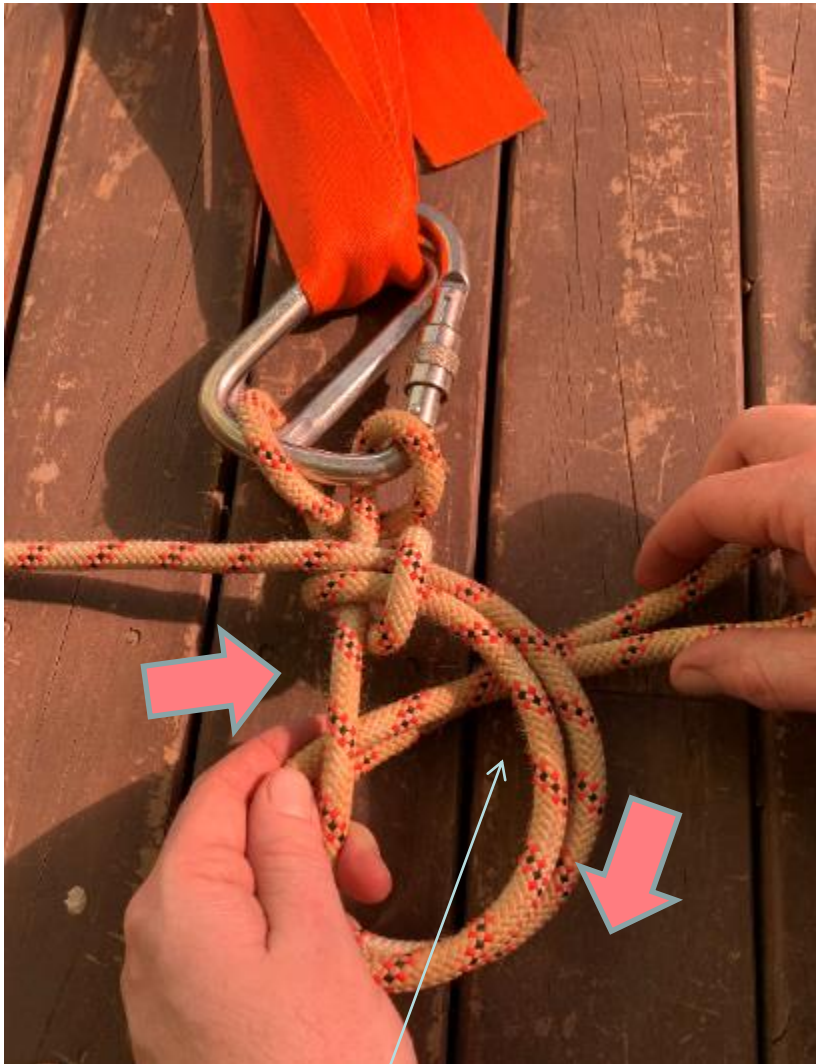


Pull 2nd loop through until tight & pack close onto the carabineer. Need a reasonable tail length to tie the locking overhand knot

- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

3. Add the overhand knot as safety back-up to prevent mule accidentally coming undone

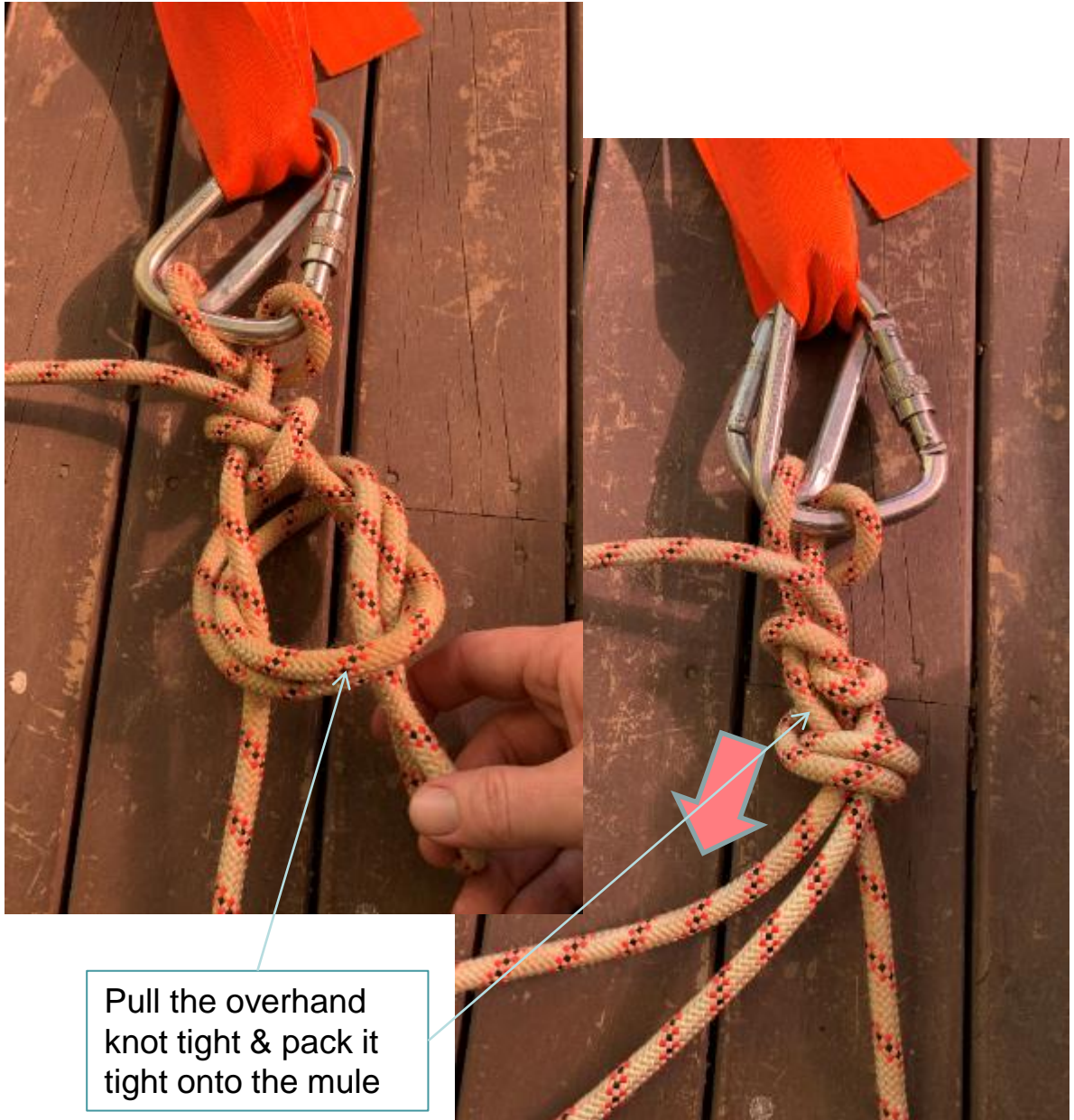


Use the 2nd loop tail to tie an overhand knot on the abseil rope

- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

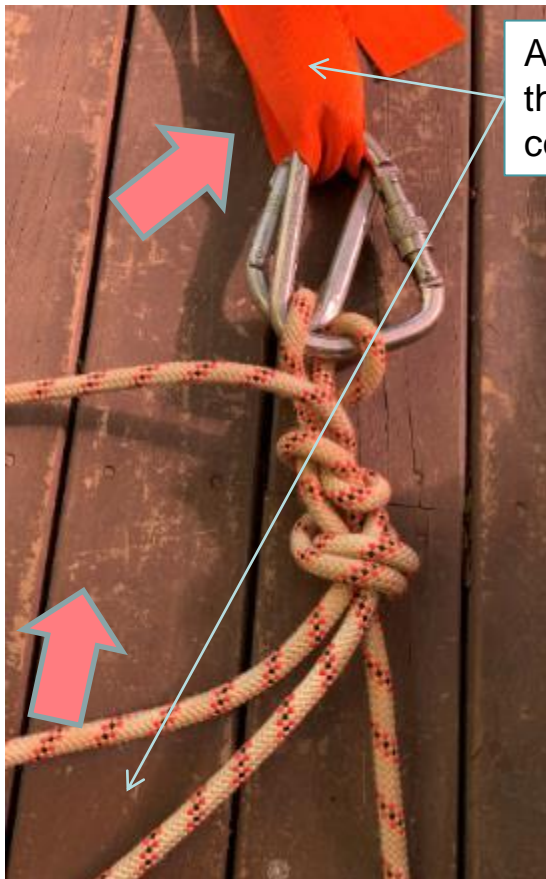
3. Add the overhand knot as safety back-up to prevent mule accidentally coming undone



- **Munter Hitch plus Mule & overhand (tie-off)
In an abseil set-up**

This is a 3 step process:

3. + anchor tail of overhand loop to prevent it being caught up in other activity at the anchor point



Add a carabineer to the tail of the overhand knot loop & connect into the anchor



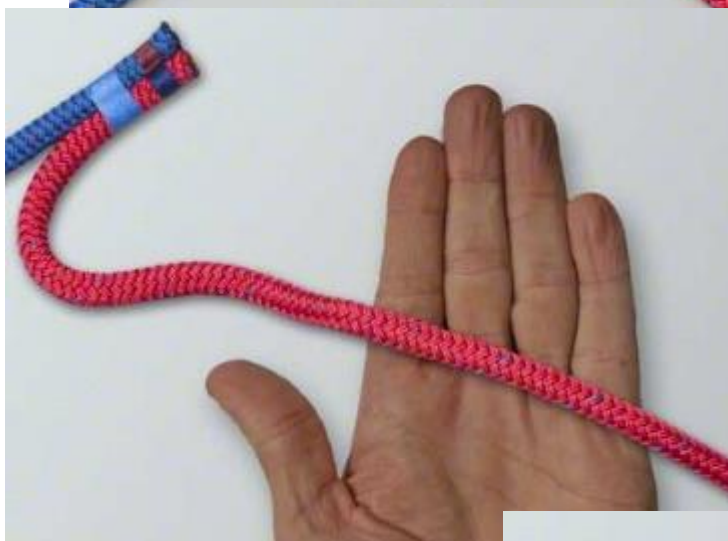
Completed Munter
mule & overhand
releasable anchor

- Alpine Butterfly Bend - as 2 rope connection**



Alpine Butterfly Bend Tying

Join the two ends temporarily. Wind the rope around your hand so that the join is by your finger tips. Go around again. Fold the join back and then up under the other ropes. Push the knot off your hand and tighten to see the appearance of the Alpine Butterfly. Finally, release the temporary join.

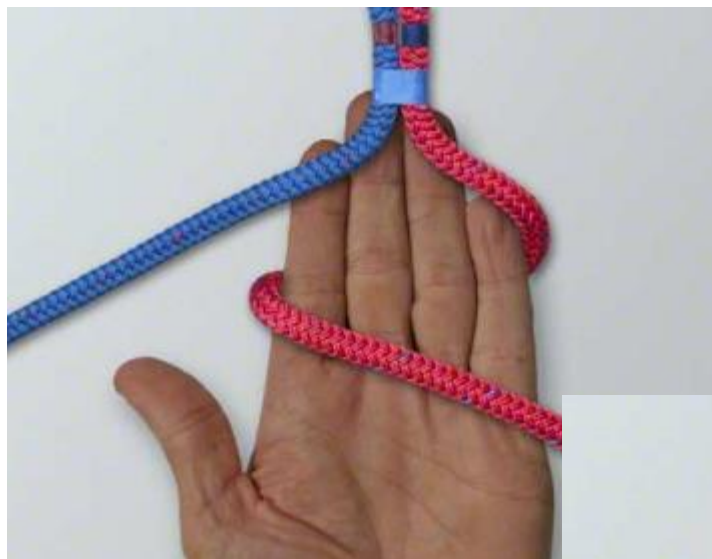


Alpine Butterfly Bend Tying

This knot can also be tied using Alpine Butterfly method 2 - after connecting the 2 rope ends with a band or using a reef knot as temporary joining.



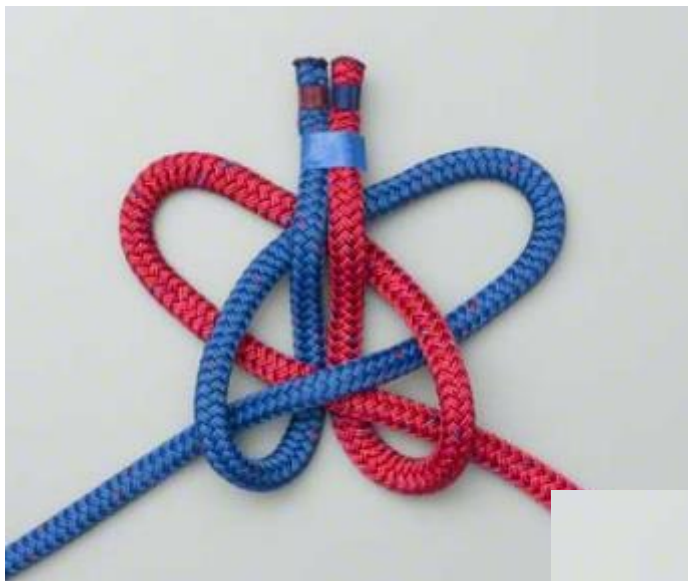
- **Alpine Butterfly Bend - as 2 rope connection**










- **Alpine Butterfly Bend - as 2 rope connection**






- **Alpine Butterfly Bend - as 2 rope connection**



Alpine Butterfly - 2

1	Create a loop in the rope where you need to create a temporary connection loop	
2	Trist the RH end of loop away from yourself to create the '8' shape 	
3	pass the RH end of the '8' back under the main line of the rope 	
4	Take the LH end of the loop over the main line of the rope & insert it through the inner loop on the RH side of the main line of the rope 	

Alpine Butterfly – 2 cont.

5	Then pull the loop through to create the new temporary attachment loop	
6	While holding the small attachment loop you have created pull just the portion of the main rope line closest to you to tighten & complete the knot	
	<p>Finished knot.</p> <p>Note: <i>these outside loops are never loaded so knot very easy to undo. This is critical for a knot somewhere well away from either end of a rope.</i></p>	

- **Double Fig. 8 Eye Knot**



Structure: The Double Figure 8 Loop

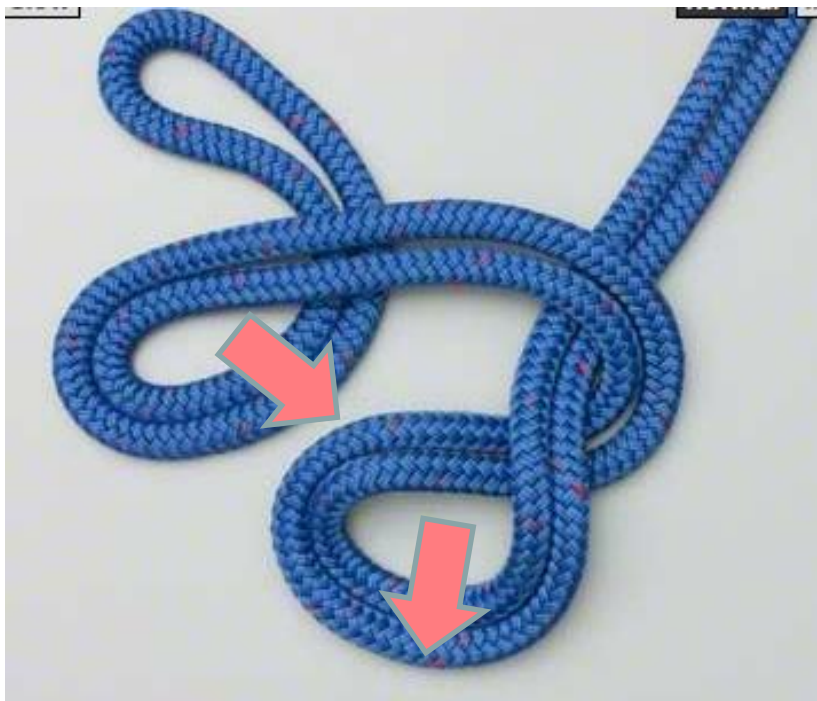
In the pictures the two loops have been made small. In practice they are usually much larger.

Uses: The two loops are useful for equalizing the load on two anchors. In one top-rope technique, the loops are made very unequal. The much larger one is passed around both anchor points. The centre of this loop is then secured with a karabiner to the small loop. During rappelling, this ensures a more even distribution of load between the two anchor points.

Stability: Compared to some of the other double loop knots, e.g., the French Bowline, the Double Loop Figure 8 is stable. It is unlikely to slip so that one loop gets larger at the expense of the other loop.



- **Double Fig. 8 Eye Knot**



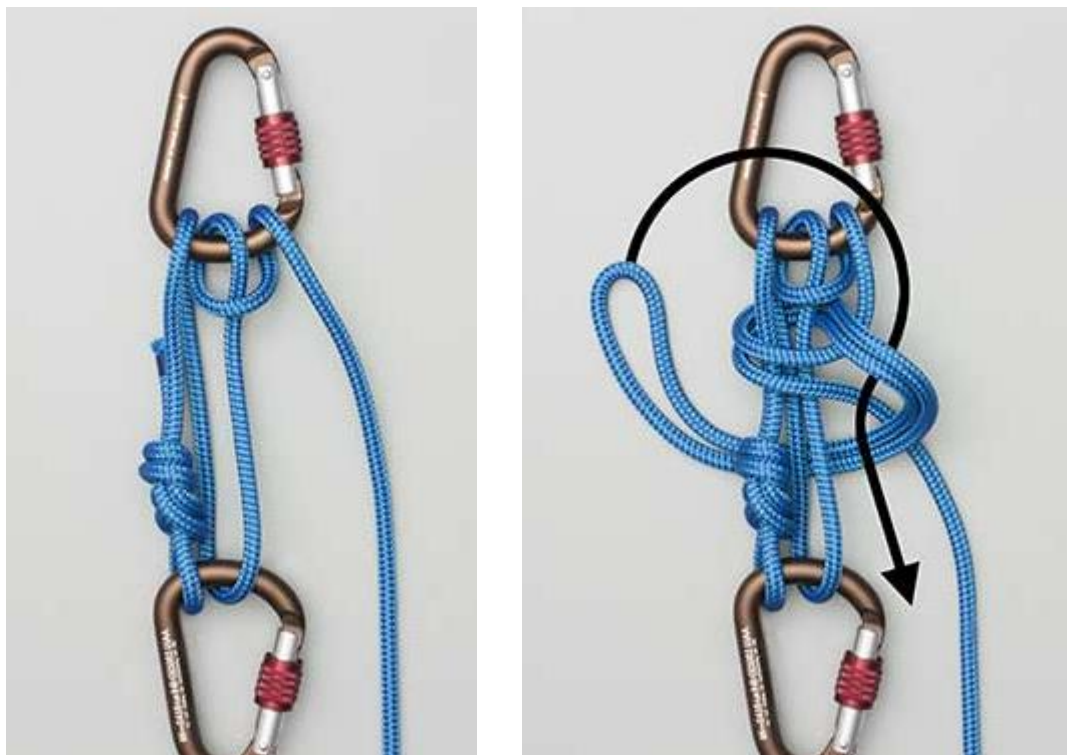
- **Double Fig. 8 Eye Knot**



- **Double Fig. 8 Eye Knot**



- **Load Releasing Hitch**



Radium Release Hitch Tying

Tie a Figure 8 Loop Knot in the end and hook it into the lower carabiner. Pass a loop through the top carabiner and then through the lower one. Tie a Munter Hitch in the top carabiner. Use a bight to tie a Half Hitch and then an Overhand Knot. Untie these knots to lower the load.

Radium Release Hitch is a load-releasing hitch used in a two-rope technical rescue system.

Uses: - The Radium Release Hitch allows a load to be transferred from one rope to another if, for example, a Prusik Knot jams or a belay line's auto-stop engages. It is commonly rigged prior to the operation by a Search and Rescue team on the belay line anchor. The primary function of this hitch is to transfer load back to the main load line if the belay line's auto-stop becomes engaged. The resulting stoppage of the belay line can be due to a variety of causes including: main line load being lowered too quickly for the belay line operator to keep up or actual main line failure.

- **Load Releasing Hitch**



- **Load Releasing Hitch**



- **Load Releasing Hitch**



- **Zeppelin or Rosendahl Bend**



Zeppelin Bend Details

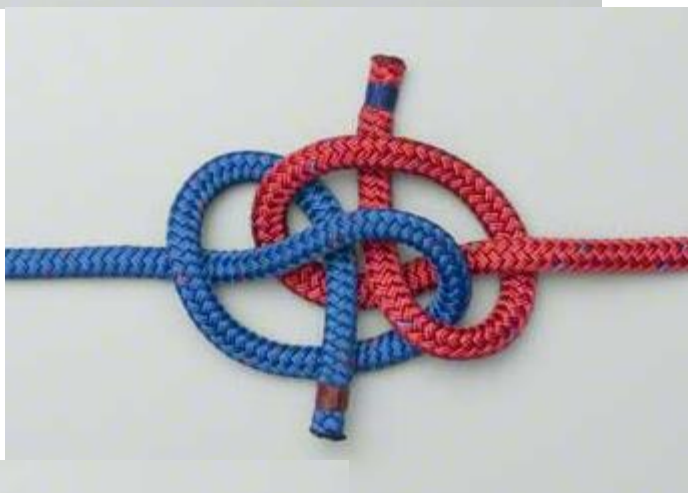
Uses: The Zeppelin Bend is one of the bends employing interlocking overhand knots. It is a reliable bend that can be untied even after being heavily loaded but not, however, while still under load. It is an excellent alternative to the more widely used [Double Fisherman's](#) because it eliminates the risk of jamming.



- **Zeppelin or Rosendahl Bend**



- **Zeppelin or Rosendahl Bend**



- **Double Overhand Noose or Poacher's Knot**



Poacher's Knot (Strangle Snare) Tying
 Form a bight in the end of the rope. Loosely wrap the end around the bight twice. Tuck the end through these turns to complete the knot. Pull tight. The Poacher's is also known as a **Strangle Snare** and a **Double Overhand Noose** – because the knot tied round the standing end is known as a **Strangle Knot**

- **Double Overhand Noose or Poacher's Knot**



- Tensionless Hitch**

Tensionless Hitch Tying

Prepare sufficient rope to make 3 or 4 turns around the post. Make a Figure 8 Loop in the end and attach a karabiner. Wrap the rope around the post. Make sure there is sufficient slack and clip the karabiner to the standing end. A kink in the standing end is an error.



- **Tensionless Hitch**

