

Knots

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Photos: George Steele

The BMC

The BMC (British Mountaineering Council) is the representative body that exists to protect the freedoms and promote the interests of climbers, hill walkers and mountaineers, including ski-mountaineers.

The BMC recognises that climbing, hill walking and mountaineering are activities with a danger of personal injury or death. Participants in these activities should be aware of and accept these risks and be responsible for their own actions.

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Introduction

This is the second revision and first web version of this booklet which has received much support from novices and experienced people alike.

All knots require practice and must be checked regularly. Stiff ropes will be more difficult to tie than soft ones and the knots may be less secure. Some knots can be tied by several different methods.

Which knot?

The main reason for the choice of a particular knot for use in a mountaineering or climbing situation are its strength, security and ease of tying. All the knots recommended in this booklet have been chosen as the strongest and most suitable knot for the purpose mentioned under "use".

Length required for knots

All knots require a significant amount of rope in order to be tied. To emphasise this point the length required is stated for each knot.

Figure of Eight

on the bight* and rethreaded

Advantages

This is a comparatively simple knot to tie which will stay tied even with a fairly stiff rope.

Disadvantages

Few, but it is not so easy to adjust as the bowline. Can be difficult to untie after loading.

Uses

1. For tying on to the rope
2. For attaching to anchors

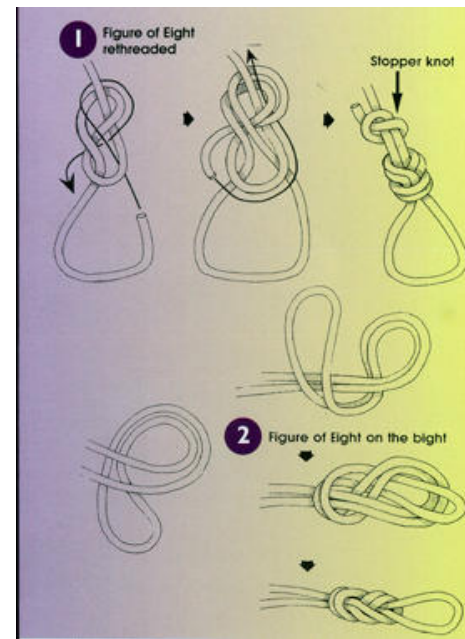
The two different uses involve tying the knot differently as shown below

Advice

Can be inflexible when used for anchoring as it is difficult to adjust. If tied wrongly it usually turns into an OVERHAND Knot (q,v). The Figure of Eight is a stable knot but a stopper knot is often used to tidy up the loose end.

Length required:
11 mm - 150 cm
9mm - 120 cm.

* bight = a fold at any point in the rope with which the knot is tied



Overhand Knot

on the bight

Advantages

Easy to tie. Does not come undone even with fairly stiff ropes

Disadvantages

Not easy to adjust. Very difficult to untie after being loaded.

Uses

Poor alternative to the Figure of Eight for tying onto the rope as it is less strong and more difficult to untie. Equally poor alternative for anchoring.

To join two ropes for abseiling.

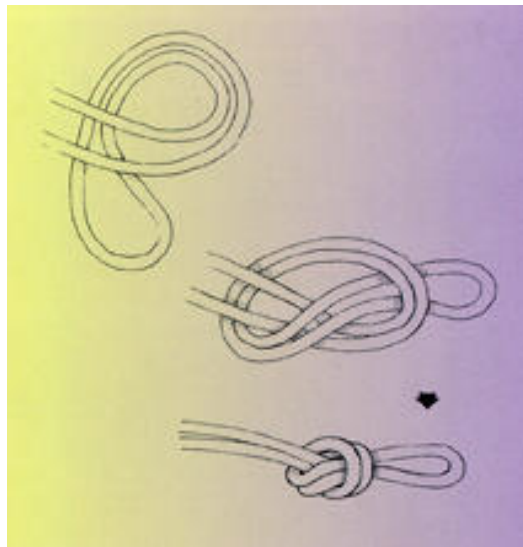
Advice

Best avoided because of the difficulty of untying after loading.

Length required:

11 mm - 80cm

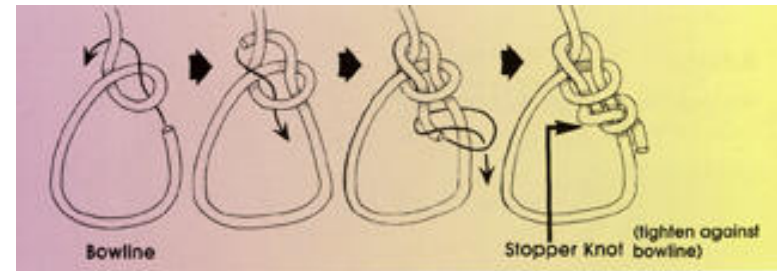
9mm - 65cm.



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Bowline and variant

This is the "classic" knot for tying on to the rope.



Advantages

It is easily adjustable but should be finished with a "stopper" knot tight against the bowline since a bowline can work loose.

Length required. 11 mm - 85cm, 9mm - 75 cm.

Bowline Variant

Advantages

Less likely to work loose once tightened. Stronger and more secure. Stopper knot unnecessary.

Disadvantages

In stiffer ropes it often will not 'bed down' and can work loose.

Uses

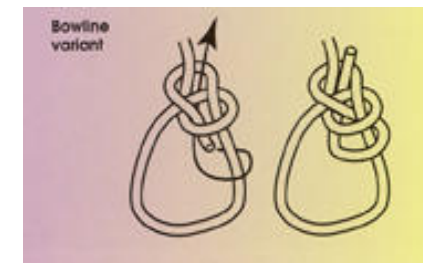
Suitable for tying on to the end of the rope. It can be used either when tying around the waist or to a harness. Convenient for tying around large anchors (e.g. blocks).

Disadvantages

More complex to tie.

Advice

Care should be taken when tying this knot because if tied too loosely it may turn into a slip knot. It is important to finish off the knot with a 'stopper' knot.



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Bowline

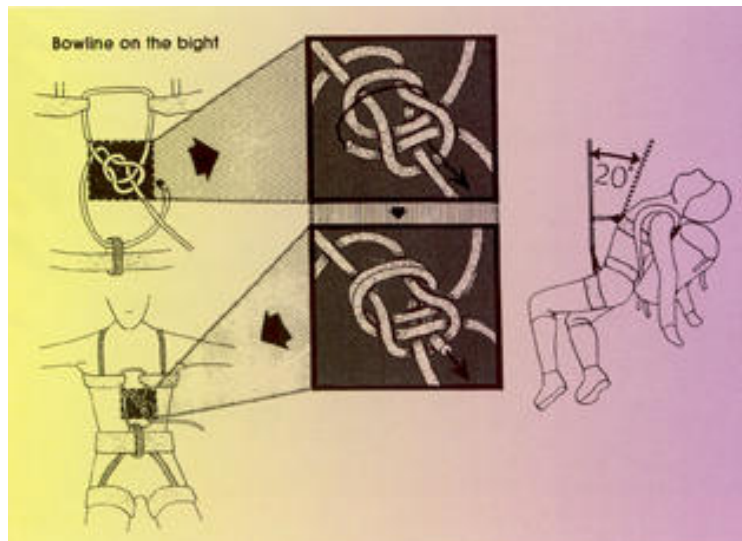
for chest & sit harness

Most harnesses (but not the Whillans harness!) can be connected to a chest harness to give the higher point of attachment which is desirable when carrying a sack as in alpine or winter climbing.

The method shown is very suitable for this purpose. The user is advised to experiment with the adjustment of the knot by hanging suspended in the harness.

As shown in the diagram, the most comfortable (and the safest) angle is achieved by adjustment of the two loops (one through the chest harness and the other through the sit harness). **Don't forget to finish off the knot with a stopper knot after adjustment.**

When attached to the rope in this manner it is best to anchor to the mountain from the front and to use a belaying method other than a body or shoulder belay (such as a Sticht plate or the Italian Hitch method)



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Fishermans Knot

Advantages

Fairly easy to tie.

Disadvantages

Can work loose, especially with stiff ropes.

Uses

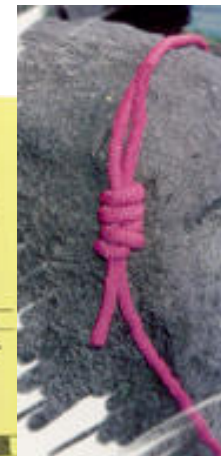
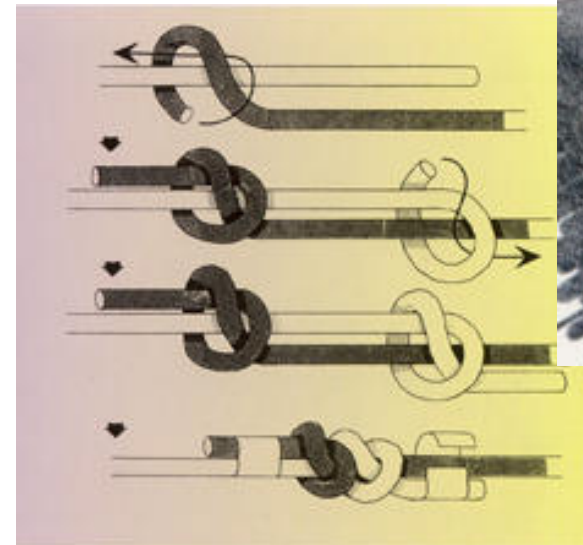
Joining two ropes for abseiling.
Forming rope slings.
Poor alternative to Double Fishermans.

Advice

The ends should be taped in order to minimise the possibility of the knot working loose but it is important to check regularly to ensure it is still bed firmly.

Length required:

11mm - 85cm, 9mm - 60cm.



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Double Fishermans Knot

Advantages

Strongest knot for joining ropes.

Disadvantages

Care needed to tie correctly.
Relatively bulky.

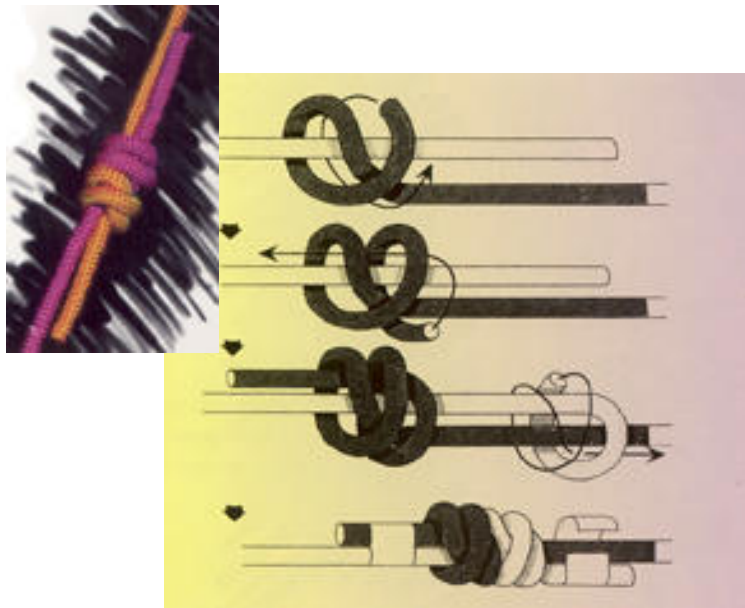
Uses

Joining ropes such as for a long abseil or forming rope slings.

Advice

Ends should be taped to minimise the possibility of the knot working loose. Check regularly to ensure it is still tied firmly. A Triple Fishermans may be appropriate for particularly slippery cord.

Length required:
11mm - 105cm, 9mm - 75cm



Clove Hitch

Advantages

Fast and relatively simple to tie and adjust.

Disadvantages

Not as strong as the FIGURE OF EIGHT on the bight for anchoring. Not safe to use at the end of a rope.

Uses

Anchoring the non-climbing members of the party on fixed ring belays.

Advice

Practice in tying the knot is essential because its normal use is in situations where speed may be important.



Italian Hitch

(A friction hitch, not a knot)

A very useful means of absorbing the energy of a fall. Used with an HMS karabiner it provides a useful friction hitch for belaying, lowering and abseiling.

Advantages

Very quick to set up.

Disadvantages

Easy to tie incorrectly.



Uses

As a direct belay with an HMS karabiner, for abseiling or lowering off.

Advice

Practice in tying and using this knot is essential in order to ensure its correct application.



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Prusik

Advantages

Relatively simple to tie.

Disadvantages

Can slip on wet or icy ropes.

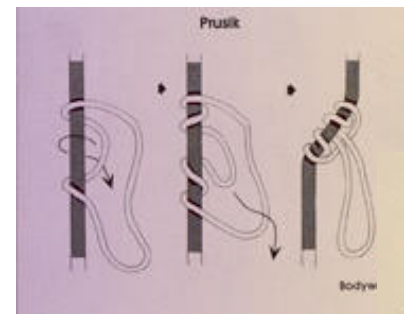
Uses

Ascending ropes, often in a self-rescue situation.

Advice

It is essential that the PRUSIK knot is tied using rope much thinner than the rope around which it is tied.

Length required: 30 cm required for knot alone in 5 mm rope sling.



French Prusik

Advantages

Can be moved by hand when under tension.

Disadvantages

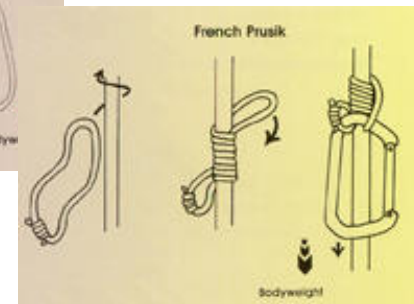
Can release under tension so should not be used for ascending.

Uses

Protection during abseil or locking off by the belayer after a fall. Hoist and pulley systems.

Advice

Best tied with a fairly short loop. As with the Prusik, relatively thin rope should be used.



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Klemheist

Advantages

Can be tied with any size of tape used for slings.

Disadvantages

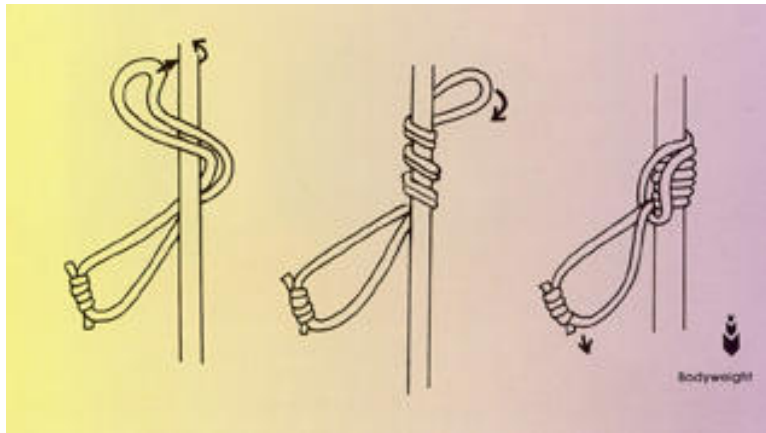
Cannot be released under tension. May jam up.

Uses

Can be used in any prusiking situation. Ideal when only tape slings available.

Advice

Three or more complete turns usually required. For clarity diagram shows the Klemheist being tied with cord - the process is identical when tape is used.



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Tape Knot

Advantages

Relatively simple to tie.

Disadvantages

Can easily work loose. It is essential that the knot is tightened under load before use.

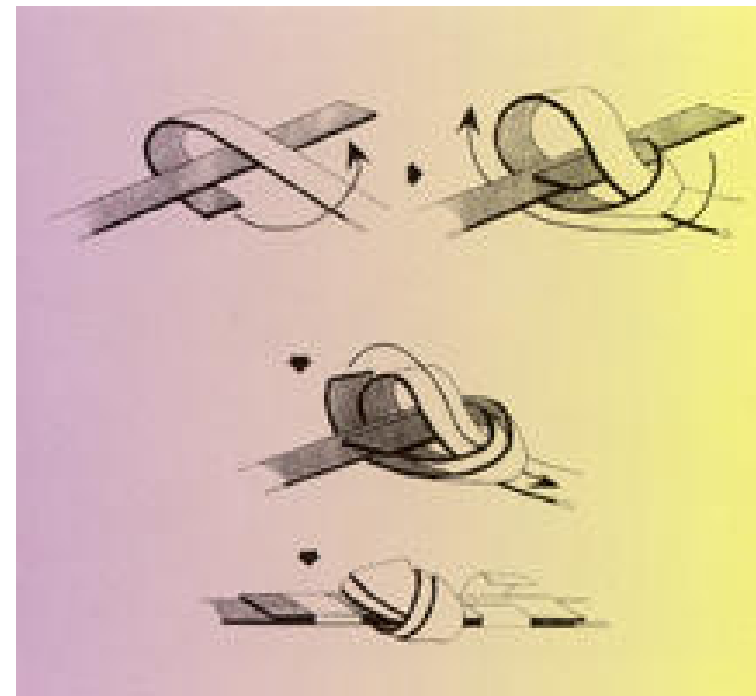
Uses

The only knot suitable for tying tape

Advice

Make sure the knot is tight. The end should be taped to minimise the possibility of the knot working loose. Check regularly to ensure it is still tied firmly.

Length required: 25mm tape - 65cm.



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