HANDBOOK OF KNOTS

Learn how to tie over 100 knots using clear instructions and annotated, step-by-step photographs

Choose knots for fishing, camping, sailing, climbing and general or decorative use with the help of quick-reference symbols

Select the correct rope for the job by assessing the different types of rope and their functions and breaking loads

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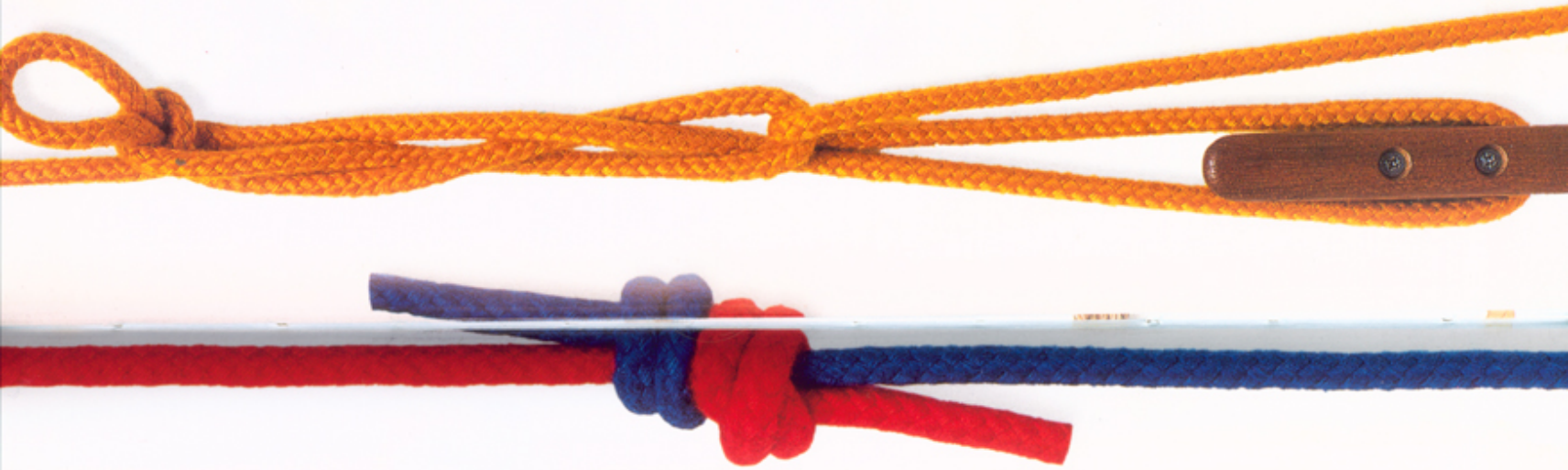

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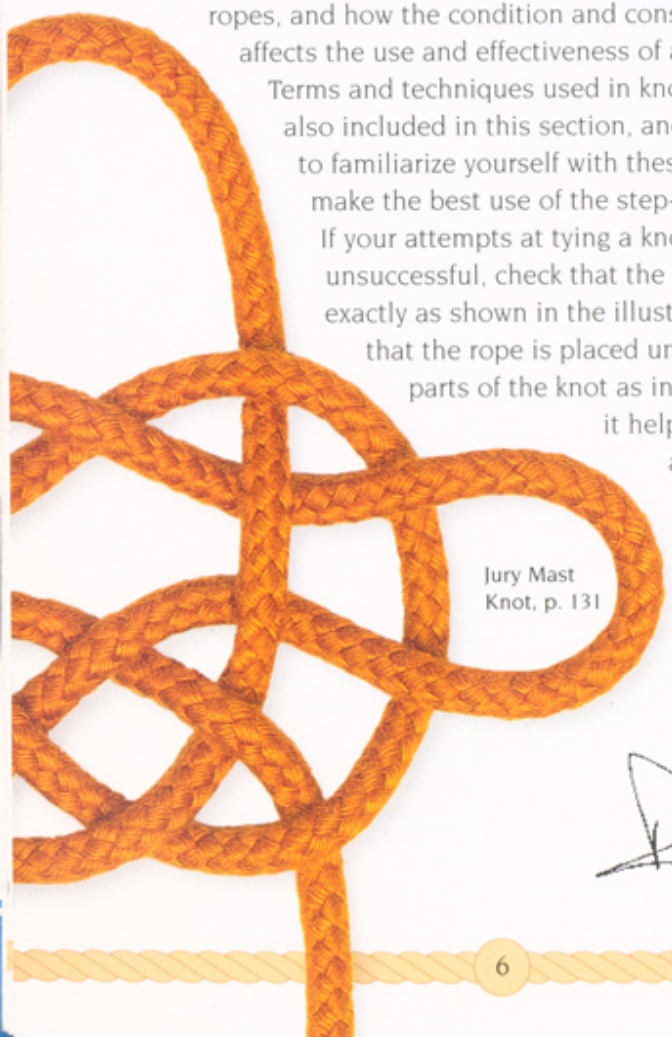
Introduction

Knots have been present at every stage of human progress, from their early use in making shelters and weapons to the sailor's dependence on knots in the great age of overseas exploration. During this time thousands of knots have come into being for a vast range of tasks. The knots that I have chosen to include in this handbook are the most useful of those that are still known today, each one – whether centuries old or newly discovered – having proved to be reliable, safe, and effective when tied and used correctly.

Tying Knots Successfully

This book aims to help you identify the right knot for a task, and to tie it without getting into a frustrating tangle. Start by reading the section on Using Rope (p. 8) so that you understand the properties of different ropes, and how the condition and construction of a rope affects the use and effectiveness of a knot tied in it. Terms and techniques used in knot tying are also included in this section, and it is essential to familiarize yourself with these so that you can make the best use of the step-by-step instructions. If your attempts at tying a knot are repeatedly unsuccessful, check that the rope is positioned exactly as shown in the illustrations, and ensure that the rope is placed under or over other parts of the knot as instructed. I also find it helpful to continually adjust the rope to retain the shape of the knot so that the parts described may be easily recognized. Happy knotting!



Jury Mast Knot, p. 131

How to Use This Book

To select a knot, first identify the knot family that is most appropriate for your task. The purposes of the different knot families are described at the start of each chapter. Use the icons and introductory text at the beginning of each knot to identify its categories of use and its properties. Refer to pp. 22–25 for knot-tying techniques common to many of the knots, and consult the Glossary (p. 171) for explanations of terms italicized in the text.

Icons

The categories of use for knots are indicated by the presence of one or more of the symbols below, making it easy to choose a knot for the task in hand.

- General Purpose
- Fishing
- Camping
- Sailing
- Climbing
- Decorative

Arrows

Red and blue arrows are used in some steps to indicate when a rope needs to be tightened, and to show the direction of movement of a rope.

Red Arrow
A red arrow is used to show when it is necessary to pull a rope tight.

Blue Arrow
A blue arrow is used to show the direction in which a hand, tool, or rope is moved.

USING ROPE

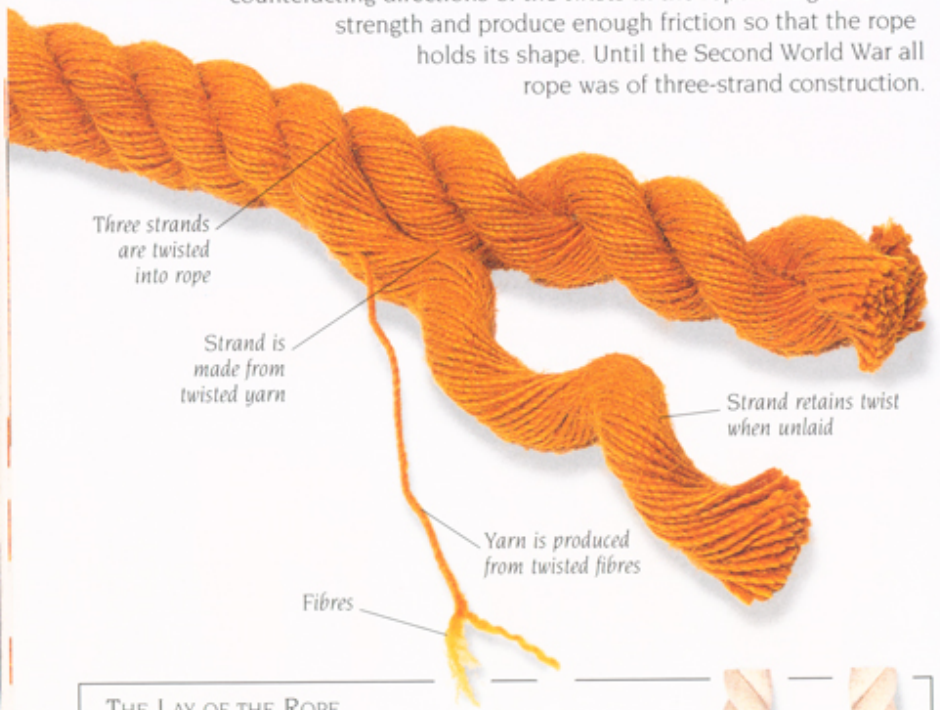
Understanding the properties of rope and knowing how to keep it in good condition are essential to the effective application of knots. This chapter shows how to match a rope to a task according to its construction and the material from which it is made, and how to maintain and store rope so that it will remain safe to use. Basic terms, equipment, and techniques are introduced at the end of the chapter.

Rope Construction

Rope is made of short fibres spun into yarn, which is made into flat or twisted strands. These strands are then twisted or braided to make the finished rope. This final stage of the construction of a rope, together with the material the rope is made from, will determine the texture, flexibility, stretch, and durability of the rope, as well as the way it handles when it is used to tie knots.

Three-Strand (Laid) Rope

Three-strand, or laid, rope is made from yarns twisted together in one direction to make strands. Three strands are then twisted together in the opposite direction to form rope that is flexible and strong. It is the counteracting directions of the twists in the rope that give it strength and produce enough friction so that the rope holds its shape. Until the Second World War all rope was of three-strand construction.

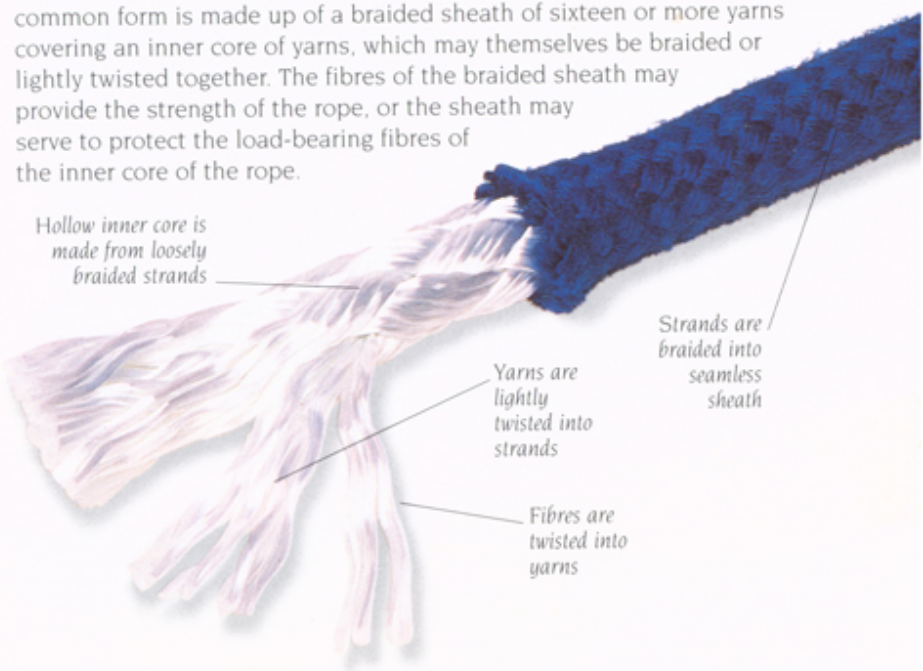


The Lay of the Rope

The direction of twist in three-strand rope is called the lay of the rope. Rope is described as S-laid (left-laid) or Z-laid (right-laid) according to whether the twist follows the line of the centre part of the letter "S" or "Z". Most three-strand rope is Z-laid. S-laid rope is usually found only in *cable*, made from three lengths of Z-laid rope twisted together.

Braided Rope

The majority of modern rope is made by braiding or plaiting yarns together. Braided rope is constructed in a variety of ways (below). The most common form is made up of a braided sheath of sixteen or more yarns covering an inner core of yarns, which may themselves be braided or lightly twisted together. The fibres of the braided sheath may provide the strength of the rope, or the sheath may serve to protect the load-bearing fibres of the inner core of the rope.



Braided Rope Construction

Braided rope with a sheath and a core is available in a number of different combinations of construction. Some braided and plaited ropes have no core at all. This variety gives a choice of ropes with a wide range of properties.

Multiplait (Square-Plait) Rope
This flexible rope does not kink. It is plaited with two pairs of Z-laid and two pairs of S-laid strands (opposite).

Hollow Braid
Found only in small sizes of rope, braided rope with no core is very flexible but tends to flatten during use.

Braid on Braid
A braided core protected by a braided sheath gives a rope with less flexibility and stretch than a hollow braid (left).

Parallel Core
This rope is very strong. Its braided cover protects a low-stretch core of parallel or lightly twisted yarns.

Rope Materials

The properties of a rope are determined by the material from which it is made as well as its construction. A range of synthetic and natural materials is used in rope-making, giving different ropes suitable for a variety of tasks. For the properties of rope materials in their different constructions, consult the chart on p. 15.

Synthetic Rope

Since the invention of nylon in the 1930s, a number of types of synthetic fibre have been used to make ropes that are stronger, lighter, and more resistant to decay than natural ropes. They range in strength from general-purpose polypropylene ropes to the strongest ropes, made from materials such as aramid and liquid crystal polymer (LCP) fibres. Synthetic rope is more slippery than natural rope, so knots should be tested before use to ensure they are secure. It is available in a variety of colours, allowing colour-coding for different uses.

Fibrillated Polypropylene

Monofilament Polypropylene

Multifilament Polypropylene

Split-Film Polypropylene

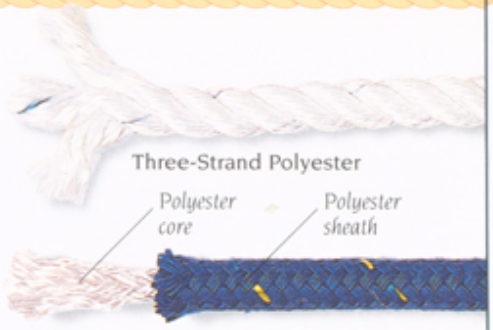
Staple-Spun Polypropylene

Polypropylene Rope

Polypropylene fibres make low-cost, general-purpose ropes that are light and float well, making them useful as rescue or short mooring lines. They have a low resistance to wear from abrasive surfaces and should be stored away from light, since they will disintegrate when exposed to ultra-violet light. Polypropylene ropes are available in a number of forms. Fibrillated fibres have the aesthetic appeal of the natural rope, hemp (p. 14). Monofilament polypropylene rope is the most resistant to wear; multifilament fibres produce a softer rope that holds knots well; while rope made from split-film fibres is inexpensive. Staple-spun fibres produce a hairy rope which the hand can grip easily.

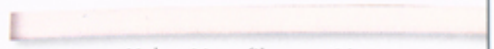
Polyester Rope

Polyester rope, available as *three-strand* and *braided rope*, is nearly as strong as nylon rope (below) but retains more strength when wet and has a lesser degree of stretch. It is hard-wearing and does not float. Pre-stretched polyester rope, which gives minimum stretch in use, is also available.

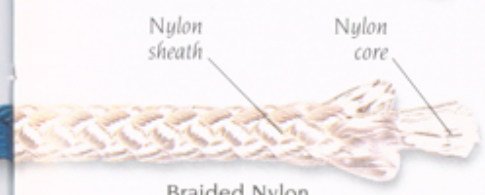


Braided Polyester

Three-Strand Nylon



Nylon Monofilament Line



Braided Nylon

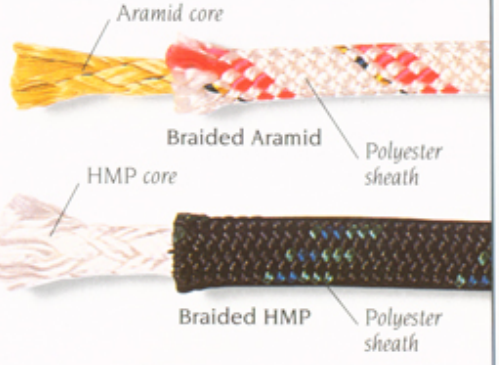
Nylon Multiplait

Nylon Rope

Nylon was the first synthetic material to be used for rope-making. It is still one of the strongest materials used to produce rope. Nylon rope has a lot of stretch, making it the most suitable rope for absorbing shock loads. It is often used to produce climbing ropes, which may need to absorb the energy of a climber's fall. When wet, nylon rope loses 5–25 per cent of its strength. Like polyester rope (above), nylon rope is hard-wearing and does not float. It is available as three-strand, braided, and multiplait rope and is commonly used for fishing *line*.

New Materials

Stronger rope-making materials, used as core inside a braided cover, are constantly being developed. Knots can greatly reduce their strength. Aramid has very low stretch, but does not work well over tight curves. Used in some fishing and kite lines, high-modulus polyethylene (HMP) is light and strong. Liquid crystal polymer (LCP) and poly [P-phenylene-3, 6-benzobisoxazole] (PBO) are new inventions. Quite expensive, all these materials are sold under various trade names.



HMP Braided Fishing Line

NATURAL ROPE

Until the 20th century, all rope was made from natural fibres derived from a variety of plants. Usually made as *laid rope*, natural rope is aesthetically pleasing but has a tendency to decay and become brittle. The following natural ropes are presented in order of strength, with the strongest appearing last.

COIR

Coir rope is made from the fibres of coconut shells. It is the weakest of the natural ropes so it is made in large sizes to compensate. Coir rope floats and stretches. It is now rarely used except in India and the Pacific.

COTTON

Now used mainly as decorative rope, cotton was one of the most popular fibres used to make fishing nets, although it needed to be treated to prevent it from rotting. Cotton rope is stretchy and soft to the touch.

SISAL

Sisal is a low-cost rope-making fibre produced from the leaves of the plant *Agave sisalana*. It can be purchased as a waterproofed rope for tasks and environments in which it will be exposed to moisture.

MANILA

Manila fibres derive from the leaves of the plant *Musa textilis*. High-quality manila rope, now rarely available, is as strong as hemp (below) and less susceptible to decay. It was widely used until the Second World War.

HEMP

Hemp fibres, produced from the stalk of the plant *Cannabis sativa*, make the strongest of all natural ropes but have a tendency to decay. For centuries, hemp was the predominant rope-making fibre.

PROPERTIES OF ROPE MATERIALS

This chart is a general guide to the properties and main uses of ropes and lines made of different materials. It compares the relative strength of each type of rope or line, showing its minimum *breaking load* when new and when used in test conditions. Reduce these figures to 1/3 when using rope in conditions with no risk, to 1/6 for general-purpose usage, and to 1/10 in high-risk conditions. Always check that a rope is suitable for your purpose: rope that stretches will absorb shock; long mooring rope should not float; durable rope will be economical. Use the appropriate rope for splices and knots so that they hold well.

MATERIAL	CONSTRUCTION/SIZE	BREAKING LOAD	STRETCH	FLOATS	DURABILITY	SPLICEABILITY	KNOT-HOLDING	MAIN USES
POLYPROPYLENE								
FIBRILLATED	three-strand (12 mm)	1,470 kg	medium	yes	fair	good	good	all/imitates hemp
MONOFILAMENT	three-strand (12 mm)	1,990 kg	medium	yes	fair	fair	fair	fishing
MULTIFILAMENT	three-strand (12 mm)	1,990 kg	medium	yes	fair	good	good	low-cost mooring
SPLIT-FILM	three-strand (12 mm)	1,990 kg	medium	yes	poor	good	good	disposable
STAPLE-SPUN	three-strand (12 mm)	1,990 kg	medium	yes	fair	good	good	low-cost mooring
POLYESTER	three-strand (12 mm)	2,230 kg	medium	no	good	fair	good	all
	braid-on-braid (12 mm)	2,400 kg	medium	no	good	poor	good	all
NYLON	three-strand (12 mm)	2,940 kg	medium/high	no	good	fair	good	climbing/mooring
	braided cover, twisted core (12 mm)	2,940 kg	medium	no	good	some	good	climbing
	multiplait (12 mm)	2,940 kg	medium/high	no	good	poor	good	mooring/anchoring
	monofilament fishing line (0.4 mm)	12 kg	none	no	good	–	good (fishing knots)	angling
ARAMID	braided core, polyester cover (12 mm)	6,500 kg	low	no	fair	very poor	poor	standing rigging
HMP	braided core, polyester cover (12 mm)	5,370 kg	low	yes	good	very poor	fair	running rigging
	braided fishing line (0.4 mm)	37 kg	none	no	good	some	fair	angling
COIR	three-strand (12 mm)	167 kg	very high	yes	poor	good	good	towing/mooring
COTTON	three-strand (12 mm)	588 kg	high	no	very poor	fair	good	decorative
SISAL	three-strand (12 mm)	936 kg	medium/high	no	very poor	good	good	all
MANILA	three-strand (12 mm)	1,050 kg	medium/high	no	poor	good	good	all
HEMP	three-strand (12 mm)	1,165 kg	medium/high	no	poor	good	good	all

Rope Maintenance

It is important to maintain rope in good condition so that it can be relied on to perform effectively and safely. Caring for rope is also economical, since protecting it will help extend its useful life. Knots are most easily tied and will hold best in rope that is well looked after.

Cleaning Rope

Sand, grit, and oil will quickly wear out a rope from the inside. To prevent this, scrub dirty rope with a solution of washing-up liquid and warm water. Hang the rope to dry completely before coiling and storing it (p. 18).

Binding Rope Ends

Prevent a cut rope end from fraying with a permanent whipping (p. 158–167), or with one of the temporary whippings given below. A cut end of synthetic rope can be sealed by melting it in a flame so that the fibres fuse together.

Liquid Whipping

Proprietary liquid whippings are available. To seal the end of a rope, dip it into a liquid whipping, and leave it to dry for a short period.

Glue

Dip *thin line* or *small-diameter rope* into a latex-based or polyvinyl acetate glue, then leave it to dry. This will form an effective seal around the rope end.

Plastic Tubing

Plastic tubing is available to use as a whipping. Fit the tubing over the end of a rope, and hold it over hot steam so that it shrinks to form a tight seal.

Adhesive Tape

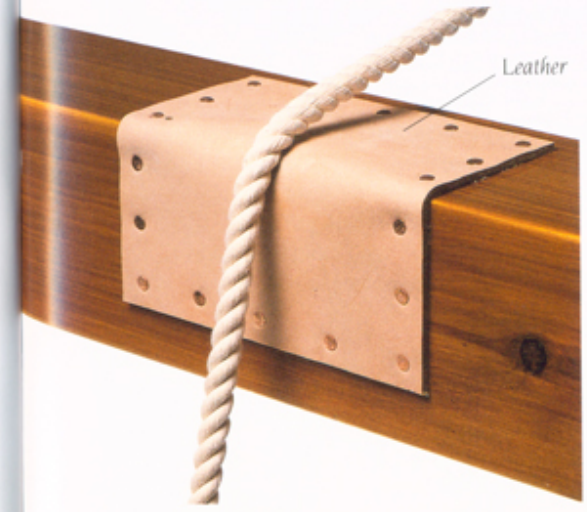
Wind adhesive tape around a rope end. This will stiffen the end, helpful when tying some knots and when tucking strand ends for splicing (p. 146–159).

Preventing Chafe

Chafe, the result of repeatedly rubbing a section of rope against a surface, will cause a rope to wear out and become substantially weakened at that point. To prevent chafe, protect rope by covering either the rope or the surface. Never attempt to apply strain to a rope that is worn.

Covering a Rope

Plastic tubing can be used as effective protection for a rope that rubs against an abrasive surface. Slide a length of tight-fitting tubing that is longer than the affected area over a rope before using it.



Covering a Surface

Rope can be protected from damage by minimizing the abrasiveness of surfaces against which it will rub. Attach a piece of smooth, hard-wearing material such as leather to a surface before allowing rope to come into contact with it. Sacking or canvas, inserted between a rope and a surface, can also be used to protect rope.

Using a Sheepshank

Strain can be taken off a worn area of a rope by tying it into a Sheepshank (p. 87). The worn area must form the centre *turn* of the knot, leaving the tightened outer turns to take any strain.

STORING ROPE

Whether uncoiling a new length of rope or storing an old rope, it is important to know how to uncoil and coil rope correctly to prevent it from tangling or acquiring a kink. Once a coil has been made, it must be secured to prevent it from unravelling.

UNCOILING AND COILING ROPE

A degree of twist is imparted to a rope whenever it is uncoiled or coiled. This can be reduced if the rope is uncoiled in the correct direction, and if the appropriate coiling method for the construction of the rope is used.

UNCOILING ROPE

Always uncoil *Z-laid rope* in an anti-clockwise direction, whether from the outside or from the centre of a coil. *S-laid rope* should always be uncoiled in a clockwise direction.

COILING THREE-STRAND ROPE

For Z-laid rope, make equal-sized circles of rope in a clockwise direction in the right hand, and transfer them as they are made to the left hand. Transfer circles of S-laid rope from one hand to the other in an anti-clockwise direction.

Clockwise circles give right-handed twist to rope

COILING BRAIDED ROPE

For *braided rope*, coil the rope in a figure of eight to balance the left and right twists of the strands.

FINISHING COILS OF ROPE

A coil can be prevented from unravelling by binding it together with separate strands of rope or with the end of the rope. Some methods of binding a coil provide a *loop* that can be used to hang the coil up.

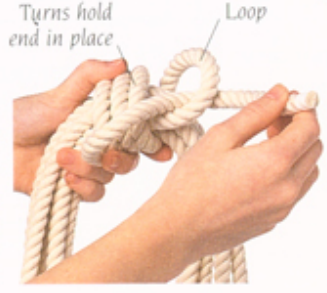
STOPPING A COIL

Use lengths of *thin line* or *small-diameter rope* to bind a large coil. With each length, tie a Constrictor Knot (p. 57) around the coil. Alternatively, tie a Packer's Knot (p. 54) or, for a quick binding, make two *turns* around the coil and tie a Reef Knot (p. 48).

SELF-STOPPED COIL

The most convenient method of preventing a coil from unravelling is to bind it with the end of the rope. The short end can be left loose, or a loop can be formed so that the coil can be hung up (below).

❶ **Coil** a length of rope, leaving the end of the rope free. Take the loose end of rope over the coil, then pull it through the centre of the coil, leaving a small loop.



❷ **Working** back from the loop, wrap the loose rope end around the coil to make three or more turns. Tuck the end through the loop. Slide the turns towards the loop to lock the loose end in place.

SELF-STOPPED COIL WITH A LOOP

To add a loop to a coil so that it can be hung up, first complete Step 1 of the Self-Stopped Coil (above). Double the remaining loose end back on itself to form a *bight*. Complete Step 2, making the turns with the bight, and passing the end of the bight through the initial loop to form the loop of the coil.

Terms & Equipment

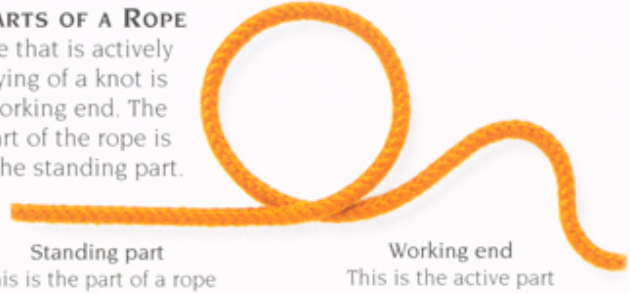
Apart from a length of rope, the only requirement for tying the knots in this book is knowledge of the terms used to describe the different parts and configurations of rope. Most knots can be tied without equipment, although a few household and specialist items may be useful for tying and finishing off some knots.

Terms

The terms in this section are only some of those developed over many centuries by tyers of knots. They identify which part of a rope is being used at a particular stage of tying a knot, and help to distinguish between similar shapes made with a rope during the construction of a knot.

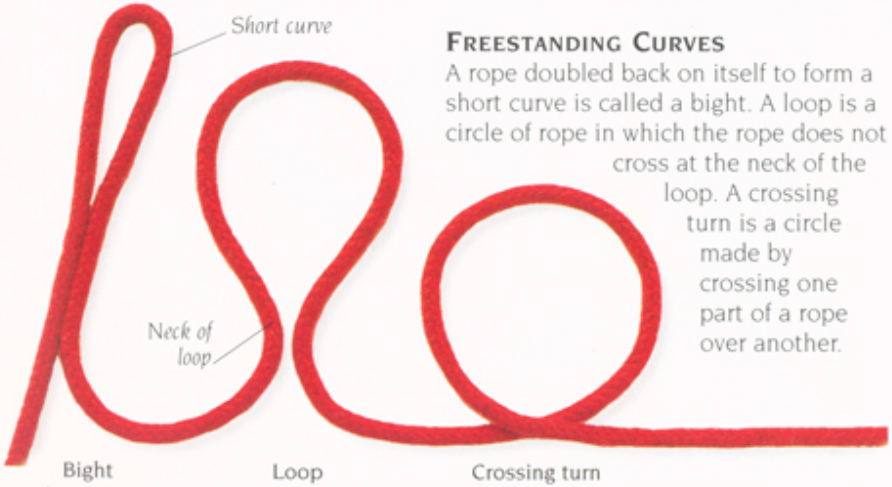
The Parts of a Rope

An end of a rope that is actively being used in the tying of a knot is known as a working end. The remaining, static part of the rope is known as the standing part.



Standing part
This is the part of a rope that is inactive during the tying of a knot.

Working end
This is the active part of a rope used while tying a knot.



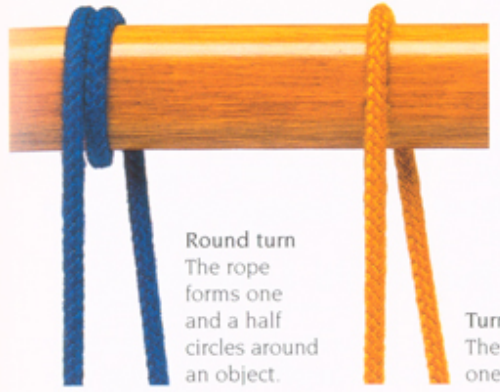
Freestanding Curves

A rope doubled back on itself to form a short curve is called a bight. A loop is a circle of rope in which the rope does not cross at the neck of the loop. A crossing turn is a circle made by crossing one part of a rope over another.

Bight
The rope is folded back on itself.

Loop
The rope is formed into a circle without being crossed over itself.

Crossing turn
The rope is crossed to form a full circle.



Round turn
The rope forms one and a half circles around an object.

Turns around an Object

A rope that completes one and a half circles around an object or another rope forms a round turn. A rope that passes around only one side of an object or rope forms a turn. (A series of circles is considered as multiple turns rather than round turns.)

Turn
The rope is passed around one side of an object.

Equipment

Equipment for tying knots is available from a ship's chandler. Use a palm for protecting the hand when tying a whipping with a sailmaker's needle; use a fid for separating stiff rope strands; and a Swedish fid for separating and tucking the strand ends of a splice (p. 146–157). A marlinespike is helpful for untying tight knots. Trim rope with a sharp knife; and temporarily prevent rope ends from fraying with adhesive tape (p. 16).

Adhesive tape
Adhesive plastic tape is used for temporary whippings.

Sailmaker's needle
Sharp triangular point is easily inserted into rope.

Iron

Palm
Iron is used to push on end of needle.

Fid
Pointed end separates strands of stiff rope.

Swedish fid
Hollow blade is used for threading strands of a splice.

Marlinespike
Blunt point is used to separate strands of a knot.

Netting needle
A tool for carrying a quantity of fine line when making a net.

Sailor's knife
Blade is straight for neat cutting.

Knot-Tying Techniques

A number of basic knot-tying techniques are common to many knots, from the simplest to the most complicated. Some techniques will help with the handling of rope, while others are used in forming knots or for completing a knot neatly. Before attempting to tie any knot, it is important to take time to familiarize yourself with these techniques, and to practise them as often as possible.

Estimating Rope Length

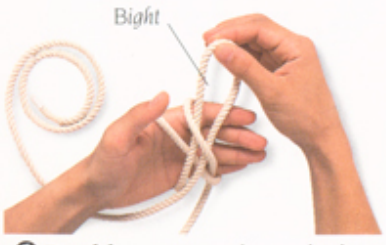
To avoid running out of rope when tying a complex knot, estimate the length of rope needed before starting by making a dummy knot. If in doubt, begin with more rope than you think necessary.

Making a Dummy Knot

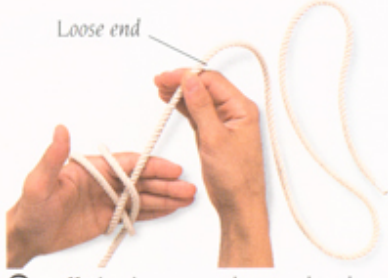
To make a rough dummy of a knot, follow the step-by-step instructions for tying the knot but leave out the detailed *tucks*. Mark the rope at the point at which the dummy knot is complete before undoing it.

Working with Long Lengths of Rope

Pulling a long length of rope through a half-completed knot can be time-consuming and may result in confusion. Minimize the length of a rope by making it into a *bight* or bundle before tucking and pulling it through.



❶ **Double** a rope to be tucked through a strand so that it forms a *bight*. Tuck the bight under the appropriate strand of the knot.



❷ **Pull** the loose end completely through. Triple or quadruple a very long rope to minimize its length before tucking and pulling it through.

Unlaying and Laying Rope

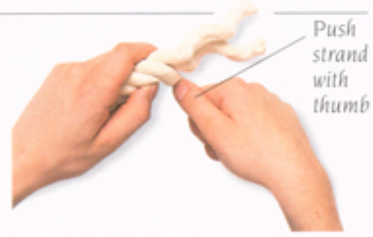
Some knots are made by separating (unlaying) then tying the individual strands of a *three-strand rope*. The strands may be twisted (laid) together again to complete the knot. Try to retain the original twist in each strand.

Unlaying Rope

Carefully unwind two strands from the end of a three-strand rope. Tape the end of each strand (p. 16) to prevent it from fraying while a knot is being tied.

Laying Rope

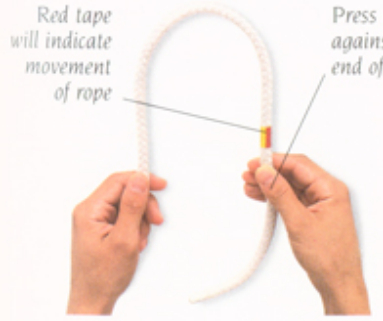
❶ **Twist** the uppermost unlaid strand in the direction that it was originally laid. Position the thumb so that it finishes on top of the strand.



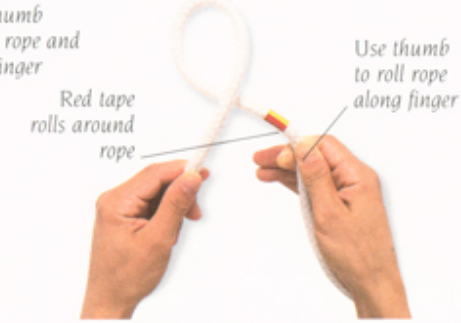
❷ **Push** the strand underneath the remaining two strands, and hold it in place. Twist and position each subsequent strand in this way until the required length of rope has been relaid.

Forming a Crossing Turn

Crossing turns are used as the basis of many knots. Twisting a rope between a finger and thumb is a quick method of forming a crossing turn, and helps to prevent unwanted twist from developing in rope.



❶ **Hold** a length of rope between both hands. Grip the part of the rope that is to lie under the crossing turn firmly between the finger and thumb.



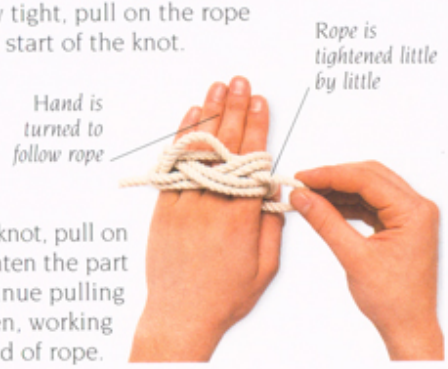
❷ **Pressing** down on the rope, roll the thumb back along the finger so that the rope twists underneath itself to form a crossing turn.

Working a Knot into Shape

Once tied, many knots will need further tightening and adjusting to improve their appearance and effectiveness. Always ensure that a completed knot matches the image shown of the finished knot.

Working Slack Out

❶ **To** work slack out of a knot and to pull the strands evenly tight, pull on the rope at the start of the knot.



❷ **Working** around the knot, pull on the rope again to tighten the part just loosened. Continue pulling the knot tight and even, working towards a loose end of rope.

Tightening Strand Ends

Tighten knots made with the *unlaid* strands of a *three-strand rope* by making several gentle pulls on each strand, one after the other. This will ensure that the strands are evenly tight.

Working Strands into Place

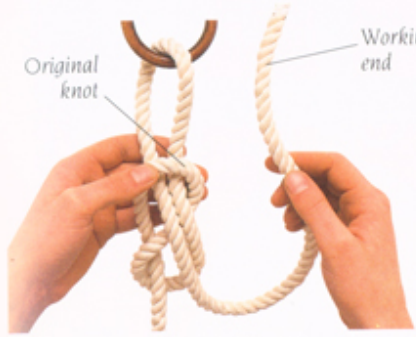
Use the fingers and thumb to push strands into position so that they lie snug and even. *Turns* can be twisted tight with the fingers and thumb.

Rolling a Splice Underfoot

The strands of spliced rope (p. 146–159) are tightened as a splice is being made. Improve the appearance of a splice after it has been completed by rolling it backwards and forwards underfoot so that the tucked strands are evenly distributed around the knot.

Doubling a Knot

Threading an additional strand of rope alongside a knot will give it extra bulk and security, and can make some knots more decorative. If even more bulk is needed, thread the rope a third or fourth time through the knot.



❶ **Using** loose rope left at the start or at the end of a knot (or, if instructed, using a second length of rope), thread the *working end* back into the start or finish of the knot.

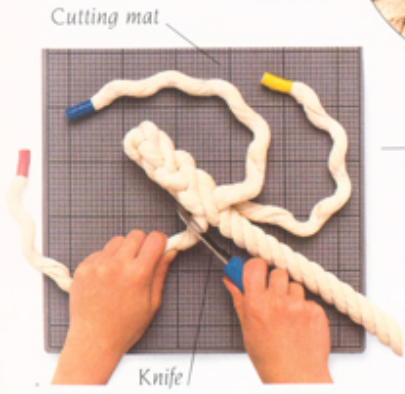
❷ **Making** sure that the second strand of rope does not cross over the original strand, follow the path of the knot with the working end until all parts of the knot have been doubled.

Finishing Off a Knot

The ends of a completed knot may need to be secured with a *seizing* to prevent the knot from coming undone. Secured loose ends should be trimmed to stop them from becoming tangled.

Seizing Ends

Bind a loose rope end to an adjacent strand of the knot with a seizing (p. 168).



Trimming Ends

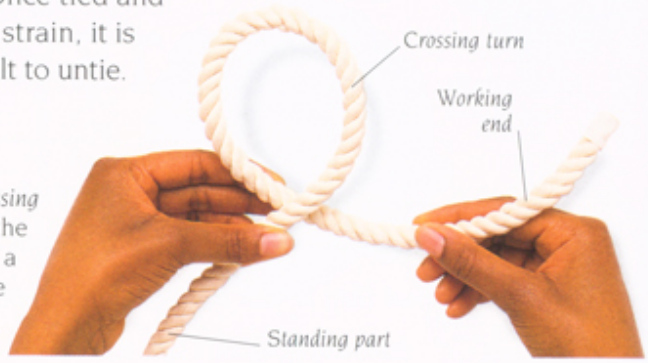
Use a sharp knife (p. 21) to trim the ends of a knot. The ends of a whipping can be trimmed close to the rope. Leave a short stump of rope on other knots so that the ends do not work loose when strain is applied to the knot.

STOPPER KNOTS

Stopper knots are used to bind the strands at the end of a rope so that they do not fray, to stop a rope from slipping through a hole, to weight a rope, or to provide a handhold. They are usually tied at the end of a rope, although some can be tied within the length of a rope. This family of knots includes some of the simplest and most commonly known knots.

Overhand Knot

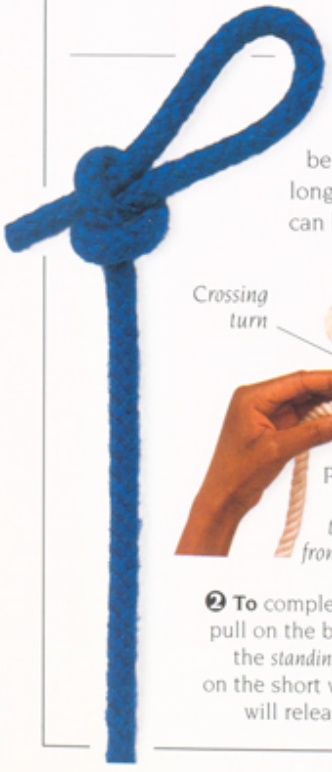
The simplest of all knots, the Overhand Knot has been in use for as long as there has been material that can be knotted. Useful as a handhold as well as a stopper, it is tied at regular intervals along lifelines to prevent the rope from slipping through the hands. It also forms the basis of many other knots, particularly in the loop, bend, and hitch families. Once tied and put under strain, it is very difficult to untie.

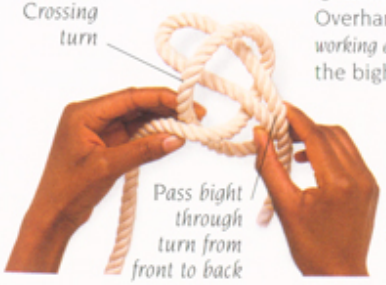


1 Make a *crossing turn* by taking the *working end* of a rope behind the *standing part*.

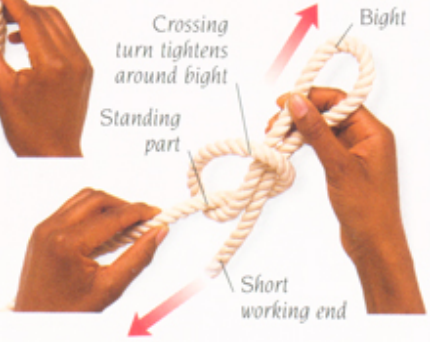
Slipped Overhand Knot

Tucking a *bight* through a *crossing turn* produces a useful stopper knot that can be as easily untied as it can be tied. Allow a long *working end* for forming the bight. This knot can be tied at the end or in the middle of a rope.

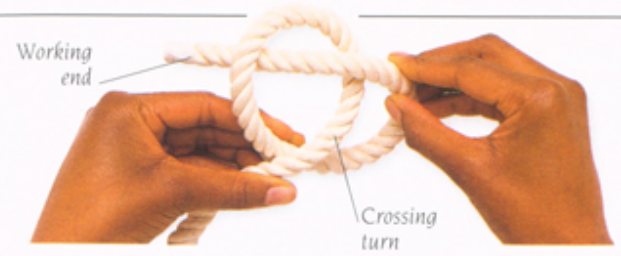




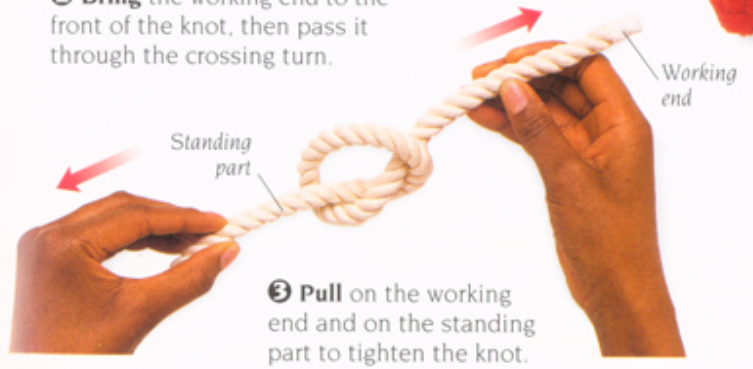
1 Complete Step 1 as for the Overhand Knot (above). Double the *working end* to form a *bight*, then pass the bight through the *crossing turn*.



2 To complete the knot, pull on the bight and on the *standing part*. A tug on the short working end will release the knot.



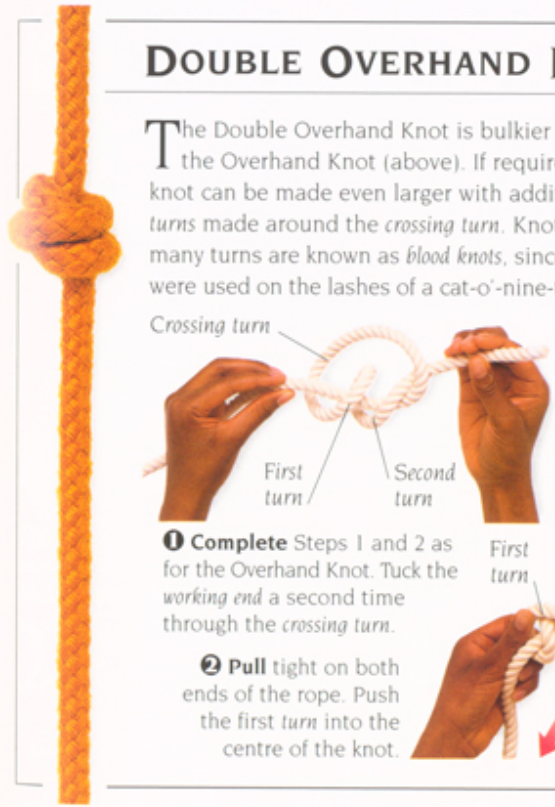
2 Bring the working end to the front of the knot, then pass it through the crossing turn.



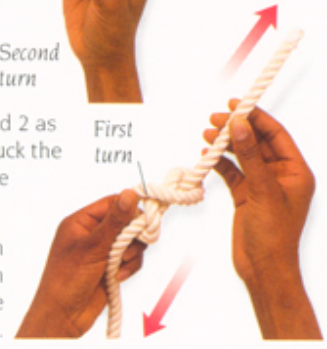
3 Pull on the working end and on the standing part to tighten the knot.

Double Overhand Knot

The Double Overhand Knot is bulkier than the Overhand Knot (above). If required, this knot can be made even larger with additional *turns* made around the *crossing turn*. Knots with many turns are known as *blood knots*, since they were used on the lashes of a cat-o'-nine-tails.



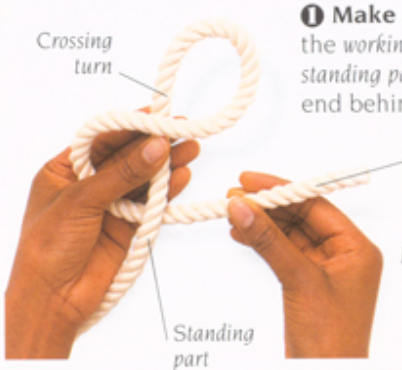
1 Complete Steps 1 and 2 as for the Overhand Knot. Tuck the *working end* a second time through the *crossing turn*.



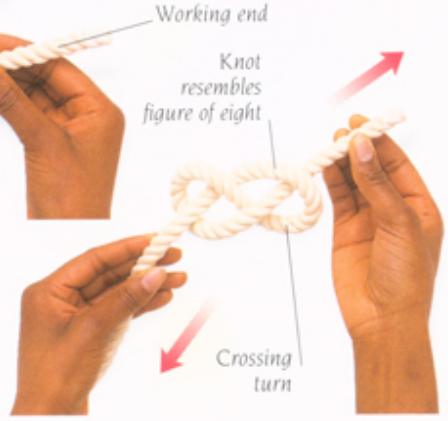
2 Pull tight on both ends of the rope. Push the first *turn* into the centre of the knot.

Figure of Eight

An extra *turn* made to the Overhand Knot (p. 28) results in the Figure of Eight, which has more bulk. It is an easier knot to untie, particularly if the knot has been put under great strain. It can be quickly tied and is commonly used by sailors for preventing a rope from slipping through a hole.



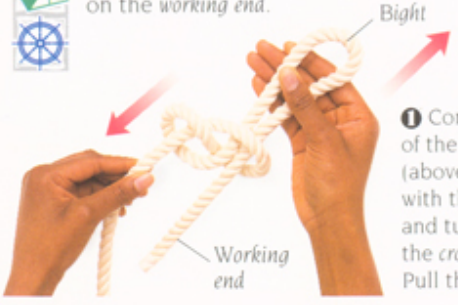
❶ **Make** a *crossing turn*, bringing the *working end* of a rope over the *standing part*. Then take the working end behind the standing part.



❷ **Bring** the working end to the front of the knot, then pass it through the crossing turn. Pull tight.

Slipped Figure of Eight

Where a stopper knot may need to be untied quickly, use a Slipped Figure of Eight, which can be released with a tug on the *working end*.

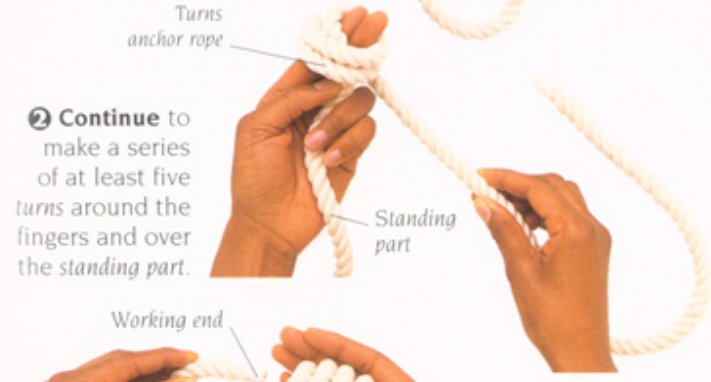


❶ Complete Step 1 of the Figure of Eight (above). Form a *bight* with the *working end*, and tuck it through the *crossing turn*. Pull the knot tight.

Stopper Knot

Although it is tied in a different manner, the Stopper Knot is a variation of the Double Overhand Knot (p. 29). It is amongst the most decorative of stopper knots. The finished knot is large enough to add weight to the end of a rope that needs to be thrown.

❶ **Leaving** a long *working end*, hold a rope in one hand. Take the working end over the rope to make a *round turn* around two fingers.



❷ **Continue** to make a series of at least five *turns* around the fingers and over the *standing part*.

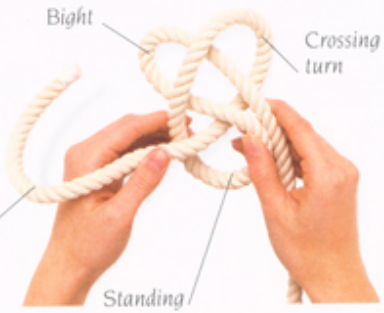
❸ **Slip** the turns off the fingers, and place them over a thumb. Tuck the working end inside the turns, then pull it through.

❹ **Pull** the knot tight. Work it into shape (p. 24) so that the turns lie neatly side by side on the finished knot.

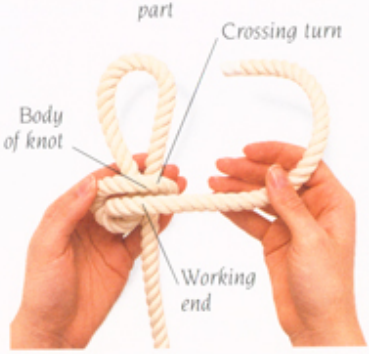
SINK STOPPER

This substantial knot is particularly useful for preventing a thin rope from slipping out of a large hole. The knot needs to be carefully tightened so that it keeps its shape.

❶ Make a *crossing turn* by taking the *standing part* behind the *working end*. Make a *bight* by doubling back the standing part, then pass it through the crossing turn from front to back.

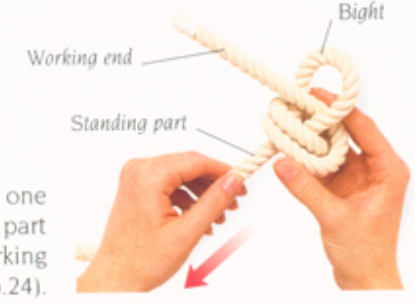


❷ Tighten the crossing turn by pulling on the bight and the working end. The turn may need to be pushed downwards to work the *body* of the knot into shape.



❸ Bring the working end across the body of the knot, laying it parallel to the tightened turn.

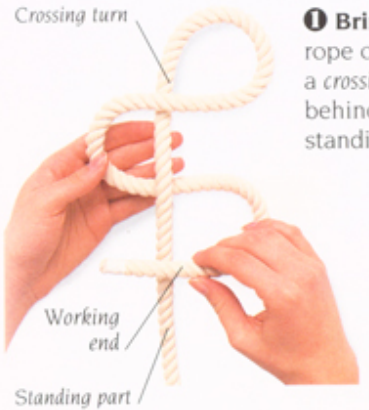
❹ Keeping the rope parallel to the crossing turn, take the working end around to the back of the knot. Pass it through the bight and pull through.



❺ Hold the body of the knot in one hand, then pull on the standing part to tighten the bight over the working end. Work the knot into shape (p.24).

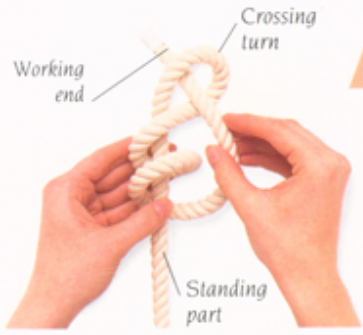
STEVEDORE KNOT

The Stevedore Knot is developed from the start of the Figure of Eight (p. 30), with two *turns* added to form a bigger, bulkier knot that can still be easily untied. The name of the knot is derived from its use by stevedores (dock workers) as a stopper knot.



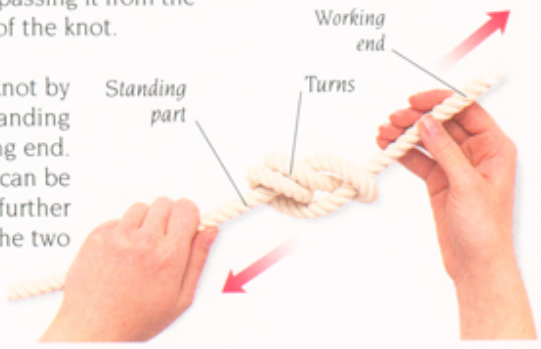
❶ Bring a long *working end* of a rope over the *standing part* to form a *crossing turn*. Pass the working end behind and then in front of the standing part below the crossing turn.

❷ Pass the working end behind the standing part one more time to form the final *turn* around the rope, then bring the working end to the front of the knot.



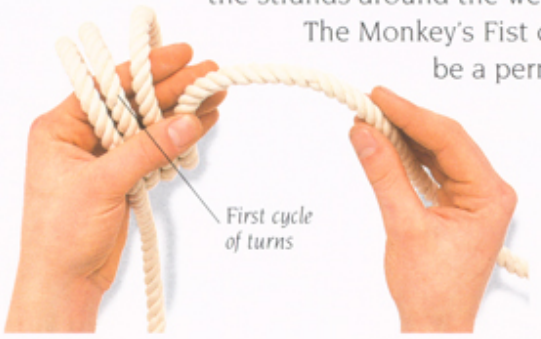
❸ Insert the working end through the crossing turn, passing it from the front to the back of the knot.

❹ Tighten the knot by pulling on the standing part and working end. The knot can be tightened still further by pulling the two additional turns against the standing part.

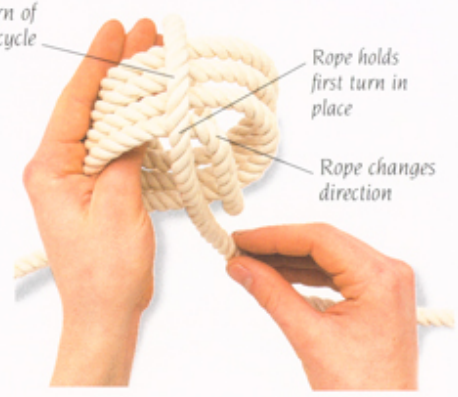


MONKEY'S FIST

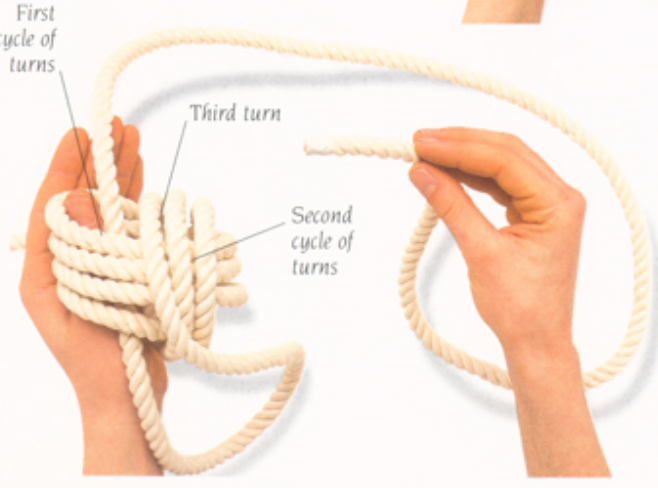
This is the most suitable knot to tie if a weight is needed at the throwing end of a *heaving line*, since a heavy object can be inserted into its centre. To achieve a knot that is decorative as well as useful, make sure that all *turns* are even and, when working the knot into shape (p. 24), tighten the strands around the weight a little at a time. The Monkey's Fist can be painted if it is to be a permanent fixture.



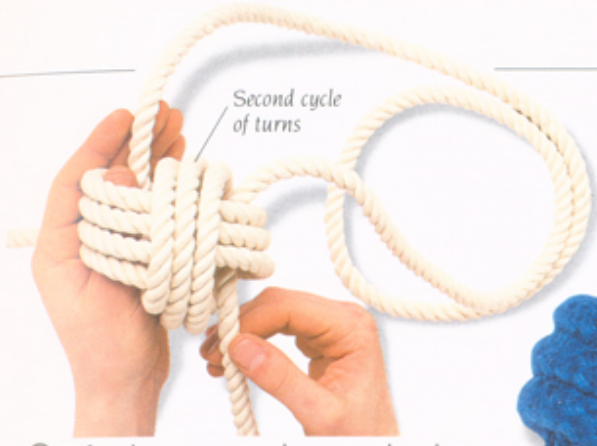
❶ Estimate (p. 22) the amount of rope needed at the end of a rope to complete the knot. Make a cycle of three *turns* around one hand, working towards the end of the rope.



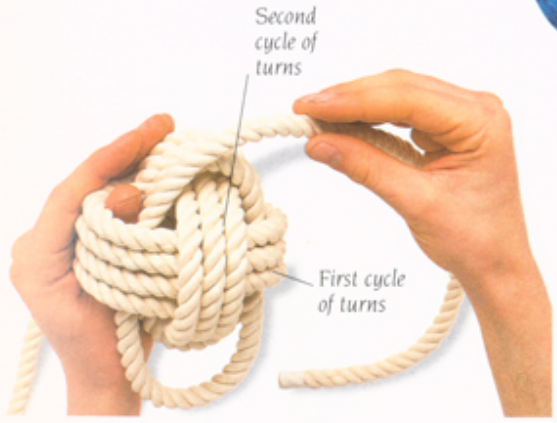
❷ Turn the rope at a right angle across the completed turns. Make a second cycle of three turns across the first, ensuring that the rope holds the first turn in place where it changes direction.



❸ Tuck the rope through the first cycle of turns beside the second. Pull the length of the rope through to tighten the third turn of the second cycle.

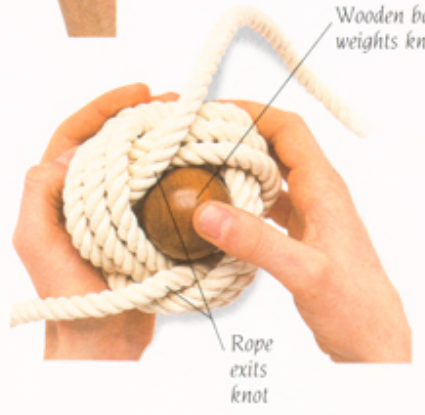


❹ Take the rope over the second cycle of turns, and tuck it back through the first cycle. Pull the rope through.



❺ Make three turns around the second cycle, tucking them through the first cycle of turns as Steps 3–4. Lay the three turns over the rope where it changes direction as before in order to anchor the rope in place.

❻ Insert a round weight – a wooden ball is ideal – into the centre of the Monkey's Fist. It is easiest to insert the weight into the gap where the rope and rope end exit the knot.



❼ Trim (p. 25) the end of the rope, then tuck it between the knot and the weight. Work the knot into shape around the weight, pulling the strands of each cycle tight.

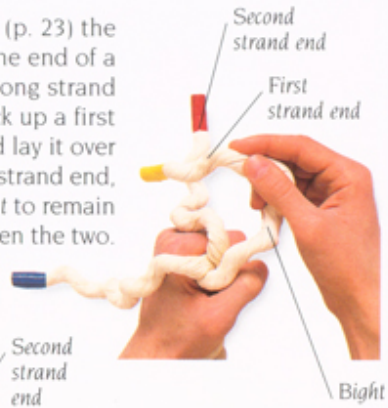
Crown Knot

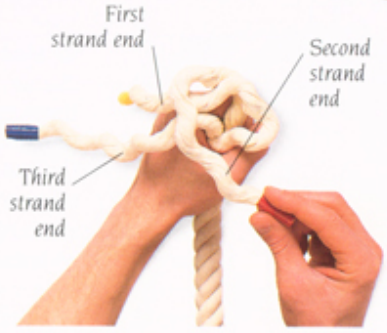
Crown Knot: overview

The Crown Knot is used as a basis for more complex knots. Made with the strand ends of *three-strand rope*, the downward *tucks* are made in an anti-clockwise direction for *Z-laid rope*.

Crown Knot: side view

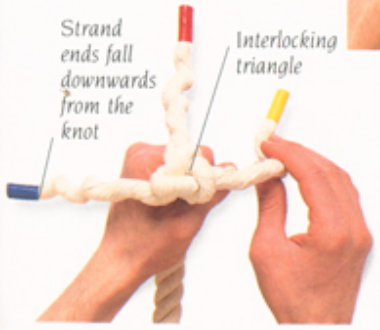
❶ Unlay (p. 23) the strands at the end of a rope, leaving long strand ends. Pick up a first strand end, and lay it over the second strand end, allowing a *bight* to remain between the two.





❷ Pass the second strand end over the first strand end, then pass it over the third strand end.

❸ Pick up the third strand end, take it over the second, then tuck it down through the bight left by the first strand end.



❹ Tighten the knot by pulling gently on the three strand ends so that they form an interlocking triangle.

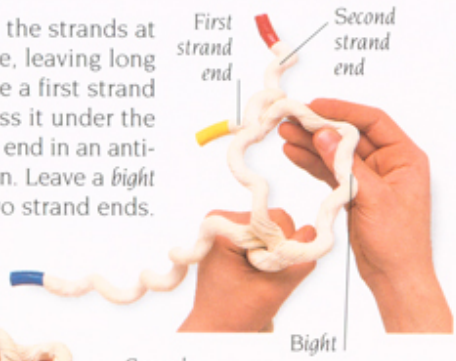
Wall Knot

The Wall Knot is tied in a similar way to the Crown Knot (opposite) and is also used as the basis for other knots. Whip (p. 160–167) the ends before using it as a stopper knot. To tie the Wall Knot, each strand end is passed around and underneath the next strand end.

Wall Knot: overview

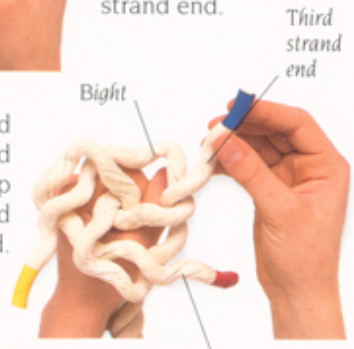
Wall Knot: side view

❶ Unlay (p. 23) the strands at the end of a rope, leaving long strand ends. Take a first strand end, and pass it under the second strand end in an anti-clockwise direction. Leave a *bight* between the two strand ends.



❷ Take the second strand end around and under the first strand end, then take it under the third strand end.

❸ Bring the third strand end under the second strand end. Tuck it up through the bight formed with the first strand end.

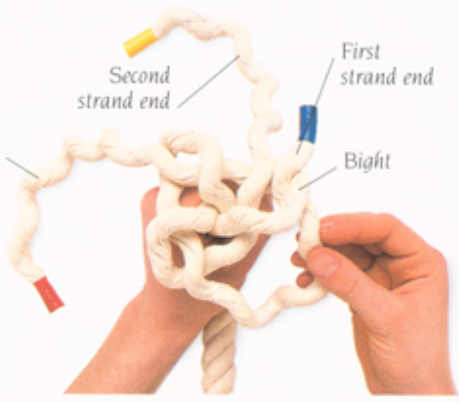


❹ Gently tighten all three strand ends to work the Wall Knot into shape (p. 24).

Matthew Walker Knot

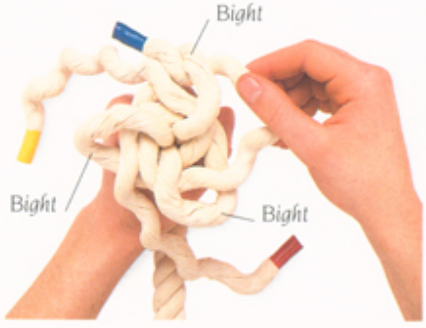
This knot is traditionally tied at the end of a rope used as a handle for a wooden bucket. It is the oldest of the few knots that have been named after their inventor. Matthew Walker, having been condemned to death as a criminal, was granted a pardon when he tied this knot in the middle of a length of rope, and the judge could neither tie nor untie it.

❶ Tie a loose Wall Knot (p. 37), leaving long strand ends. Ensure that there is a large *eye* in of each of the three *bights* formed by the Wall Knot.



❷ Choose a first strand end, take it around the Wall Knot in an anti-clockwise direction, then tuck it up through the bight from which the next strand end exits.

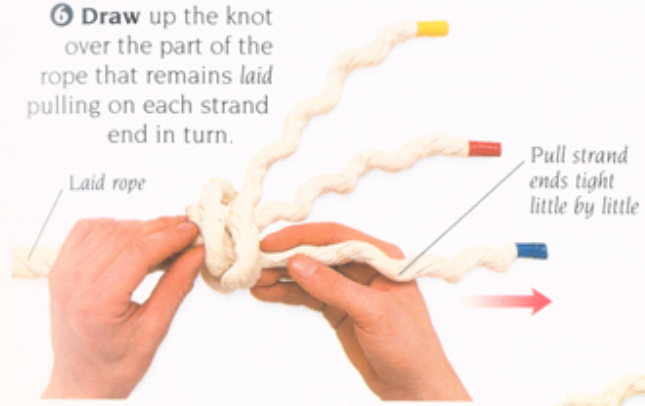
❸ Repeat with the second and third strand ends. Pull all the strand ends through, working each one a little at a time to keep the knot even.



❹ Continuing to work in an anti-clockwise direction, make a second cycle of *tucks*, passing each strand end up through the next bight from which a strand end exits.

❺ Pull the strand ends gently through so that the bights remain even. Note that the knot is made up of a series of interlocking Overhand Knots (p. 28).

❻ Draw up the knot over the part of the rope that remains *laid* pulling on each strand end in turn.

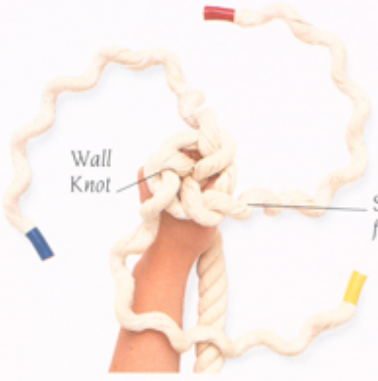


❼ Work the knot into shape (p. 24), tightening the strands so that they bed neatly side by side. If the knot is at the end of a rope, trim (p. 25) the strand ends.

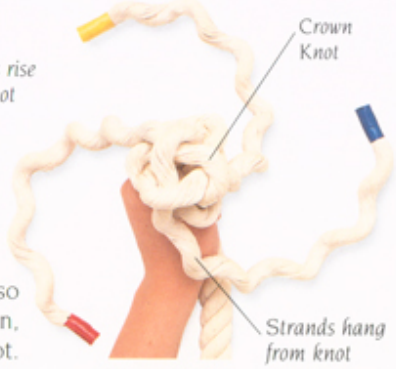
❽ If the knot is within the length of the rope, relay (p. 23) the loose strand ends. From time to time, twist the strands together in the direction that they have been relaid.

Manrope Knot

The Manrope Knot is made up of a Crown Knot (p. 36) tied on top of a Wall Knot (p. 37). This is the traditional knot tied on the ends of handrail ropes used when boarding ships. For added effect, the strands may be covered with canvas before being tied, and the whole knot painted in different colours. When these knots are doubled, care must be taken that each strand is positioned on the same side as previous strands. Tighten the knot little by little.

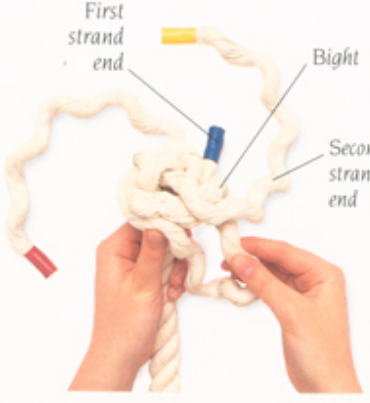


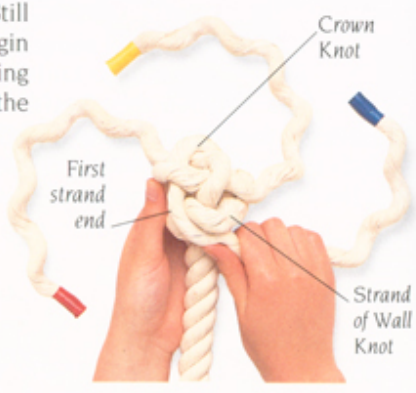
1 Tie a loose Wall Knot with long strand ends, working in an anti-clockwise direction.



2 Tie a loose Crown Knot, also in an anti-clockwise direction, on top of the Wall Knot.

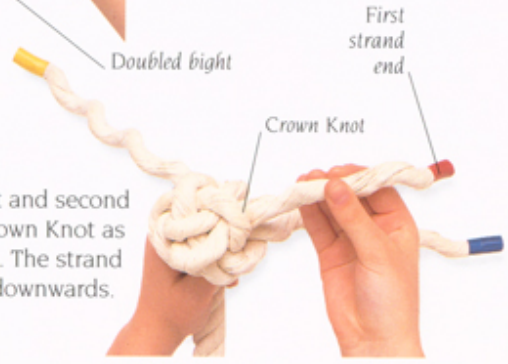
3 Pick up a strand end. Still working in the same direction, begin to double (p. 25) the knot by taking this first strand end under the nearest strand of the Wall Knot.





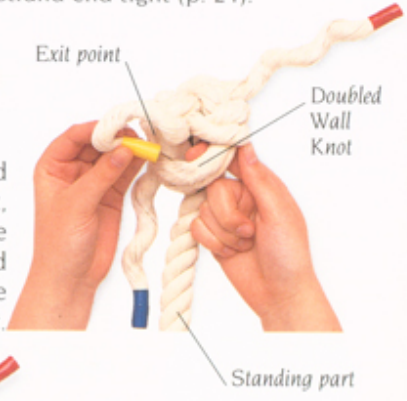
4 With the first strand end, follow the strand of the Wall Knot around, under the next strand end, and up through the first *bight* of the Wall Knot. Repeat Steps 3–4 with the second strand end.

5 Tuck the third strand end up through the first doubled bight of the Wall Knot. Gently pull each strand end tight (p. 24).



6 Double a first and second strand end of the Crown Knot as for the Wall Knot. The strand ends will be tucked downwards.

7 Tuck the third strand end through the first doubled bight of the Crown Knot. Pull each strand end tight (p. 24).

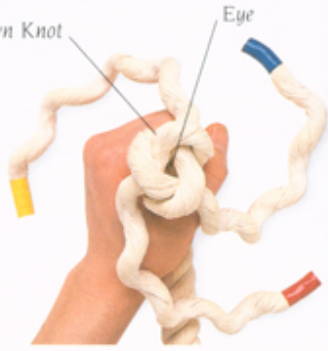


8 Tuck each strand end back into its exit point, through the strands of the doubled Wall Knot, and then out next to the *standing part*.

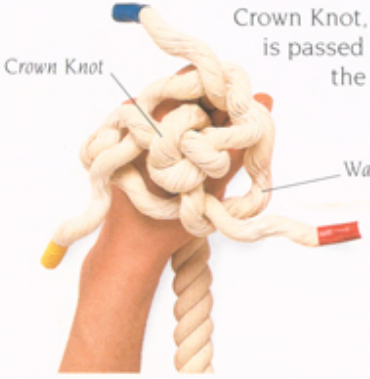
9 Pull each strand tight, working any slack out of the knot (p. 24) in the direction of the strand ends. Trim (p. 25) the strand ends close to the knot.

Diamond Knot

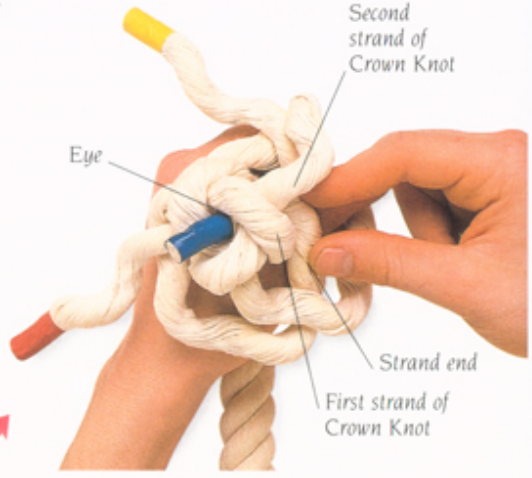
Made from a Wall Knot (p. 37) tied below a Crown Knot (p. 36), the Diamond Knot is a firm, strong stopper knot that is particularly useful when the knot needs to be decorative. To ensure that the finished knot is evenly tied, it may be necessary to work the strands into shape with a *marlinespike*, pulling each one tight little by little.



1 Tie a Crown Knot, leaving long strand ends. Pull tight, leaving a small *eye* in the centre. Note that when tying a Crown Knot, each strand end is passed around and over the next strand end.

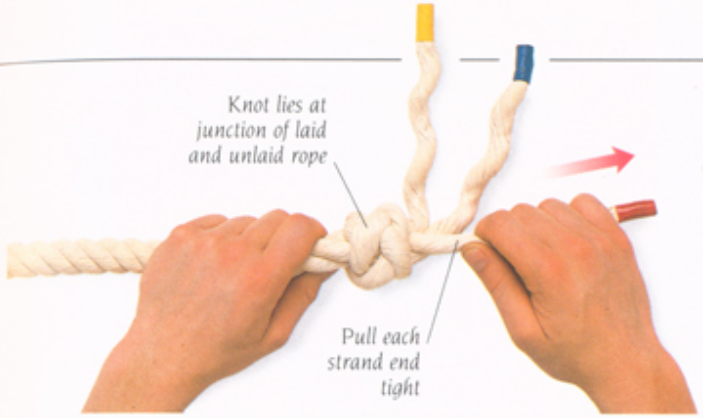


2 Tie a loose Wall Knot beneath the Crown Knot, working in the same direction. For this knot, each strand end is passed around and underneath the next strand end.

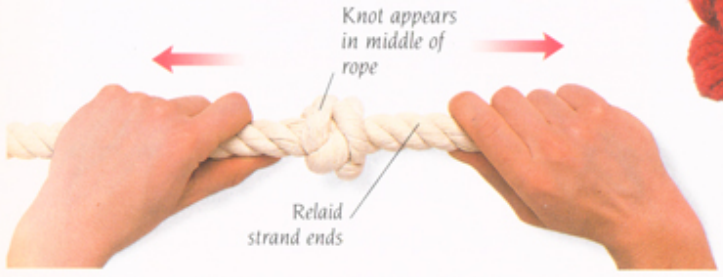


3 Tuck each strand end between the next two strands of the Crown Knot, then up through the eye in the centre of the knot.

4 Pull the strand ends tight. Using the fingers and thumbs or a marlinespike, work the knot into shape (p. 24), forming a neat plait around the *laid* part of the rope.



5 When the strands of the knot lie snugly in place, tighten them by giving each strand end a final tug. If the knot is positioned at the end of a rope, trim (p. 25) the strand ends.



6 If the knot is positioned within the length of the rope, relay (p. 23) the strand ends, twisting the rope at intervals in the direction of the *lay* of the rope. To tighten the knot still further, give the rope a tug on both ends from time to time.

Double Diamond Knot

Double (p. 25) the Diamond Knot to produce a larger, more handsome knot. Tie a Crown Knot (p. 36) and a Wall Knot (p. 37) as for Steps 1–2 of the Diamond Knot (opposite). Double the Crown Knot, then double the Wall Knot. Bring the strand ends up through the *eye* in the centre of the knot. Tighten the Double Diamond Knot, and relay the strands by following Steps 4–6 of the Diamond Knot.

BINDING KNOTS

A binding knot is used to secure a length of rope passed around an object. Often used for tying up parcels, from bundles of logs to gift-wrapped presents, most binding knots can be pulled tight and kept fixed in place. Avoid using a binding knot as a bend to join two lengths of rope, or as a hitch to tie a rope to an object, since the knot is likely to come undone under strain.

Surgeon's Knot, p. 51

Slipped Reef Knot, p. 49

Thief Knot, p. 50

Timber Hitch, p. 58

Turquoise Turtle, p. 52

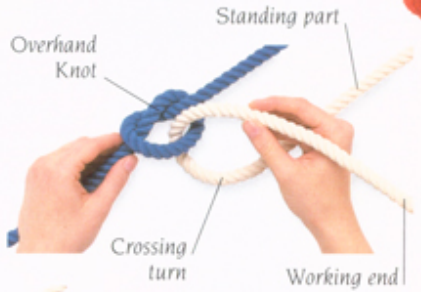
Turk's Head – Five-Lead Four-Bight, p. 64

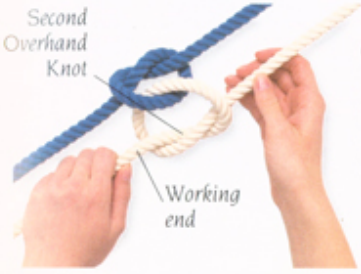
Turk's Head – Three-Lead Four-Bight, p. 60

True Lover's Knot

This is one of many knots used as a symbol of the binding love between two people. It is made up of two separate Overhand Knots (p. 28) interlinked and bound tightly together, each one a mirror of the other.

1 Tie an Overhand Knot within a length of rope. Pass the *working end* of a second rope up through the Overhand Knot, then lay it over its own *standing part* to form a *crossing turn*.





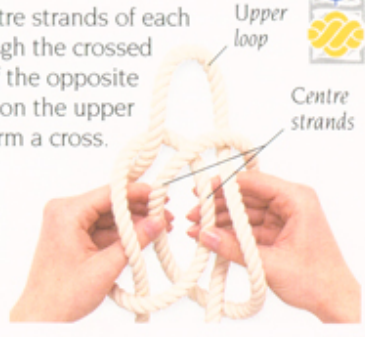
2 Tuck the working end of the second rope through this crossing turn to tie a second Overhand Knot.

3 Pull on the ends of both Overhand Knots to tighten the knot.

Sailor's Cross

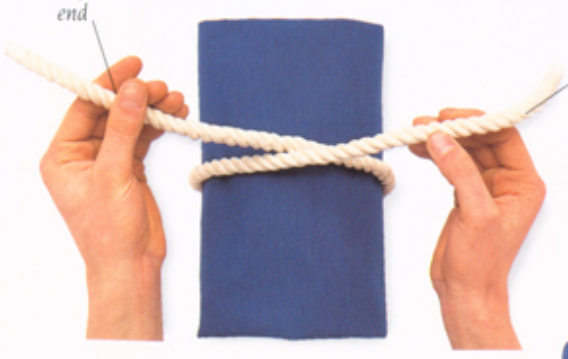
This simple cross is tied with the two ends of a single length of rope. To start, follow Steps 1–2 of the True Lover's Knot (above) to link two loose Overhand Knots.

1 Pull the centre strands of each knot through the crossed strands of the opposite knot. Pull on the upper *loop* to form a cross.

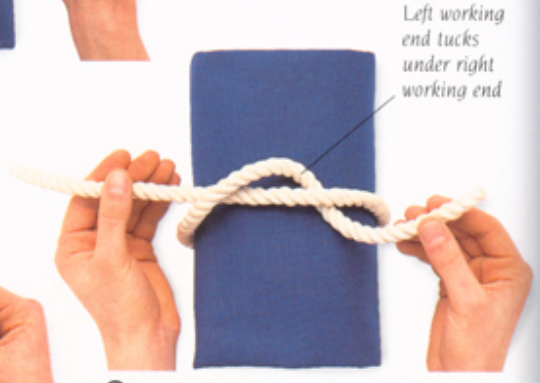


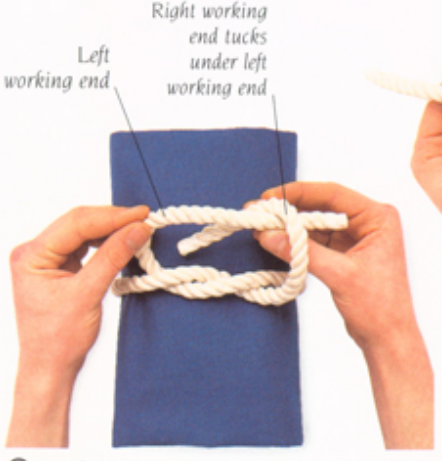
REEF KNOT

A very simple binding knot, the Reef Knot was traditionally used to tie up a reef (sail) – hence its name. It is one of a small number of knots that most people know of, but it is often tied and used incorrectly. Avoid tying a Granny Knot (opposite) by ensuring that the two *tucks* are made in opposite directions. Use the Reef Knot only as a binding knot; it must not be used to join two lengths of rope, since it can easily come undone.



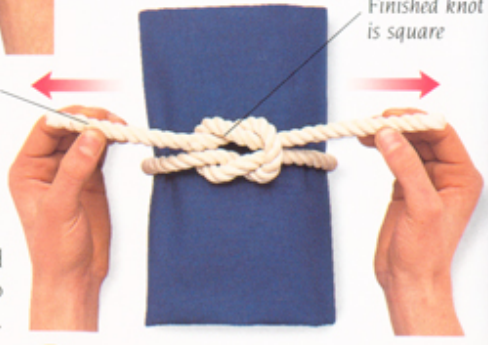
❶ Take the left *working end*, and cross it over the right working end from the bottom to the top of the object.





❷ Tuck the left working end under the right working end.

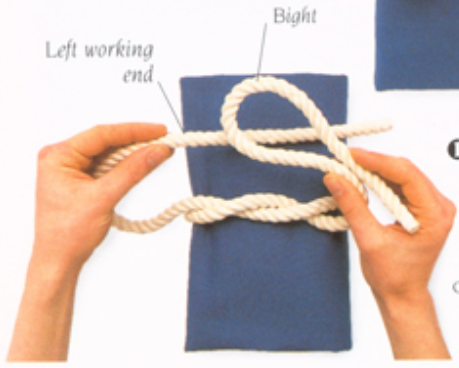
❸ Tuck the working end that now lies on the right side of the knot over and under the working end on the left side of the knot.



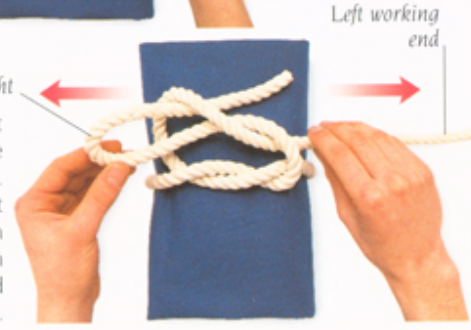
❹ Pull on the right and left working ends to tighten the knot.

SLIPPED REEF KNOT

The Slipped Reef Knot can be quickly untied by tugging on the short end of the *bight*. Start with a long *working end* in the left hand so that there is enough rope to double over into a bight.



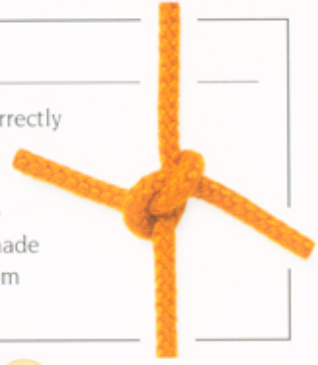
❶ Complete Steps 1–2 of the Reef Knot (opposite). Form a *bight* with the *working end* lying on the right side of the knot.



❷ Tuck the bight over and under the left working end. Pull on the left working end and on the bight to tighten the knot around the bight.

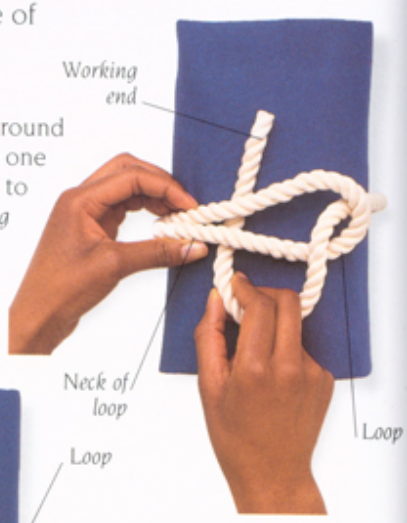
GRANNY KNOT

The Granny Knot is an incorrectly tied Reef Knot (opposite), and does not have the same square form. Each *tuck* of one *working end* over the other is made from the same rather than from the opposite side of the knot.

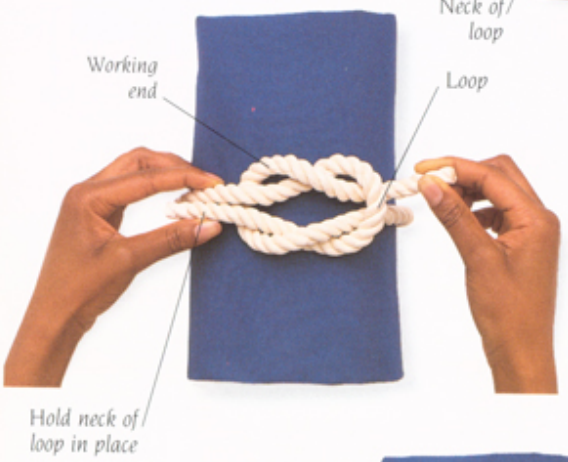


Thief Knot

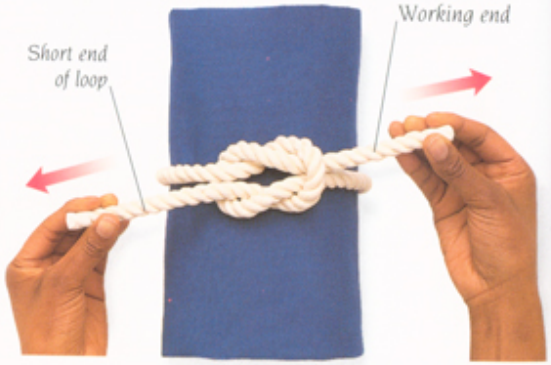
Similar in appearance to a Reef Knot (p. 48), this knot was once used to detect thieves. After untying what seemed to be a Reef Knot tied around a sack or bag, a thief would then carefully retie a Reef Knot. But the short ends of the Thief Knot lie on opposite sides of the knot, not on the same side – clear evidence of unwelcome interference.



❶ **Pass** a length of rope around the item to be bound. Fold one end of the rope back on itself to form a *loop*. Bring the *working end* up through the loop, then take it underneath the neck of the loop.



❷ **Tuck** the working end back down through the loop.



❸ **Pull** on the working end and on the short end of the loop to tighten the knot. Note that the ends lie on either side of the knot.

Surgeon's Knot

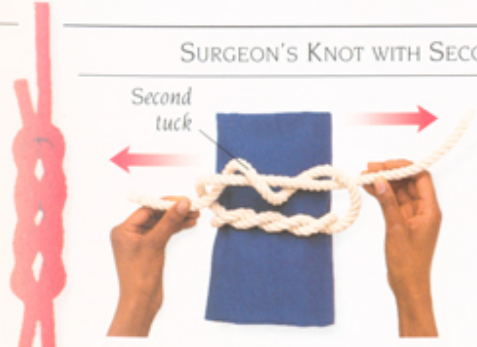
Another variation of the Reef Knot (p. 48), this knot is used by surgeons to tie off the ends of blood vessels. The extra *tuck* adds enough friction to keep the knot in place until it is completed. A further tuck will make the knot even more secure.

❶ **Take** a length of rope around an item. Tuck the *working end* on the left twice around the working end on the right.

❷ **Tuck** the working end now on the right over then under the working end on the left.

❸ **Pull** on both working ends to tighten the knot. Trim (p. 25) the working ends if required.

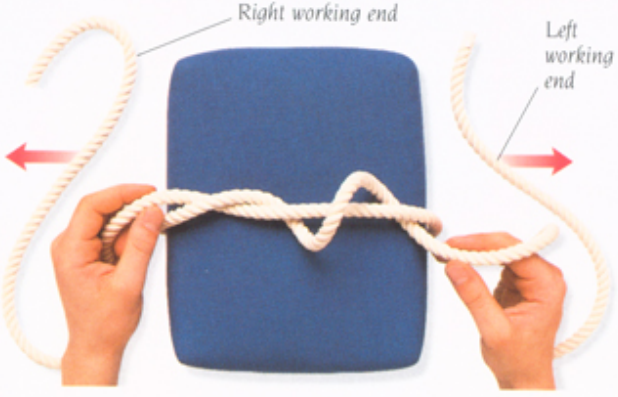
Surgeon's Knot with Second Tuck



To ensure that the ends of a slippery rope do not work loose, tuck the right *working end* of the rope twice around the left working end at Step 2 of the Surgeon's Knot (above). Pull tight.

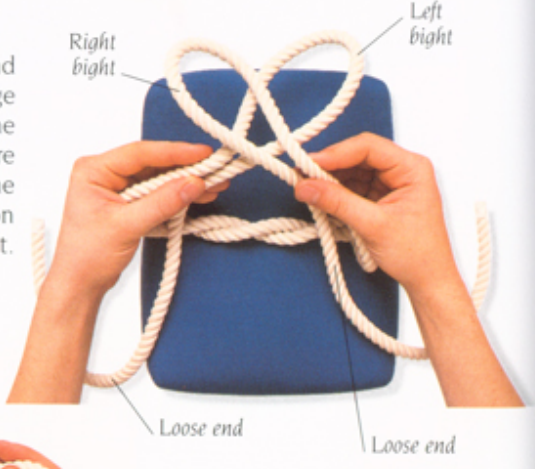
TURQUOISE TURTLE

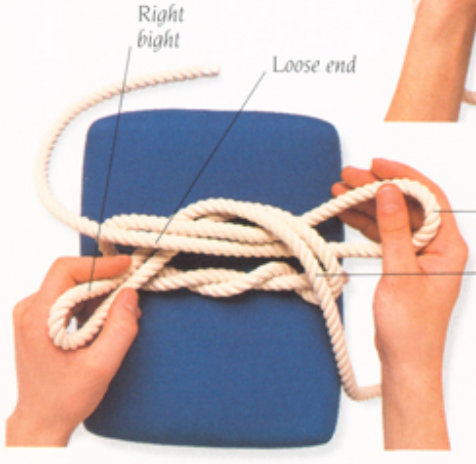
Named after the boutique where it was discovered, the Turquoise Turtle contains elements of the Reef Knot (p. 48) and the Surgeon's Knot (p. 51). It is the perfect knot for tying shoelaces (since it almost never comes undone), it looks neat, and it can be tied very quickly. To complete this knot successfully, make sure that the loose ends are positioned on the inside of the knot exactly as shown.



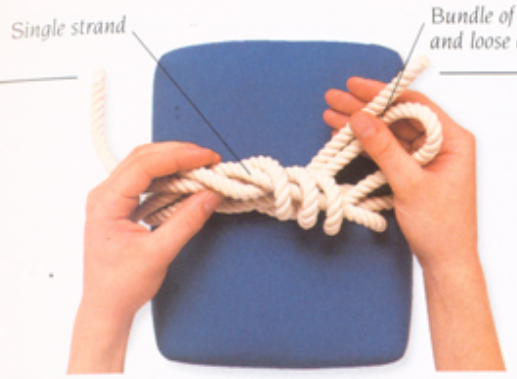
❶ **Using** a long length of rope to bind an item, tuck the left *working end* of the rope twice under the right working end. Pull both ends tight.

❷ **Double** each working end back on itself to form two large *bights* of equal size, folding the rope so that the loose ends are positioned on the insides of the bights. Place the right bight on top of the left bight.

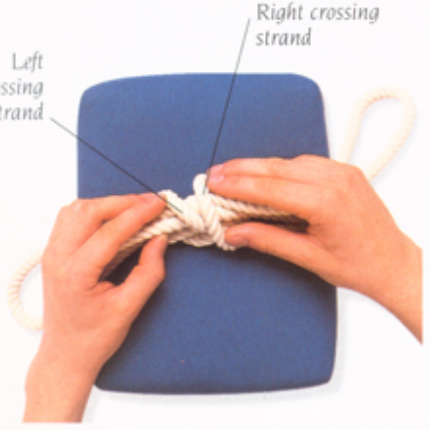




❸ **Tuck** the right bight under the left bight, and pull through. Ensure that the loose ends remain on the inside of the knot.

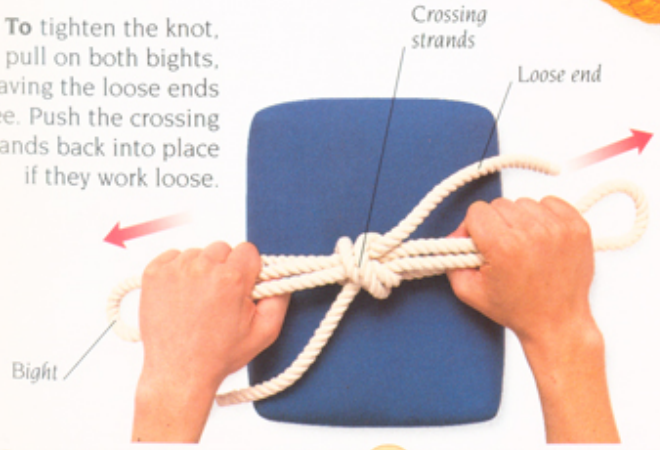


❹ **Hold** the bight and the loose end now on the right of the knot in a bundle. Tuck this bundle down through the single strand that remains on the right. Gently tighten the knot by pulling on the two bights (not on the loose ends).



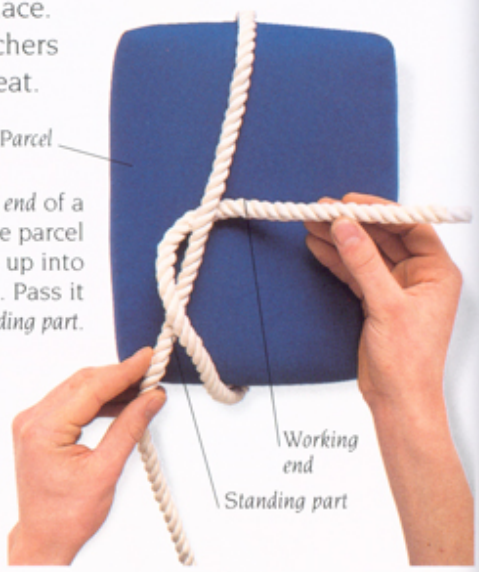
❺ **Push** the two crossing strands that have formed in the centre of the knot towards each other, then cross the right strand over the left strand. These strands will help to keep the knot in place.

❻ **To** tighten the knot, pull on both bights, leaving the loose ends free. Push the crossing strands back into place if they work loose.



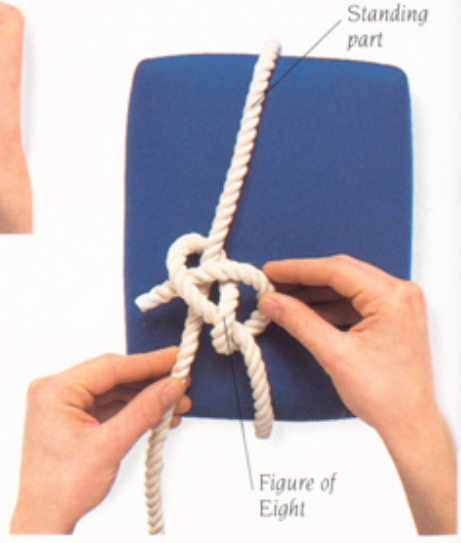
Packer's Knot

Essentially a Figure of Eight (p. 30) tied around the *standing part* of a rope, the Packer's Knot allows a binding to be tightened after the knot is tied. A finishing *half hitch* is tied to lock the knot in place. This is the knot that butchers use to tie up joints of meat.



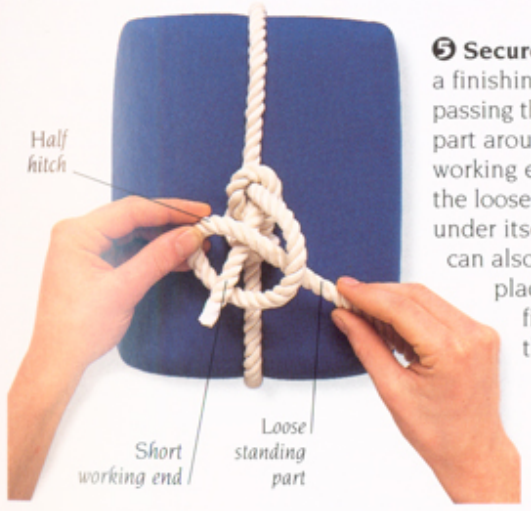
❶ Pass the *working end* of a rope over then under the parcel to be bound. Bring it up into the centre of the parcel. Pass it over then under the *standing part*.

❷ Form a *crossing turn* around the standing part by laying the working end over itself. Then tuck it underneath itself.



❸ Tuck the working end downwards through the crossing turn, making sure that it passes first over the standing part. This forms the Figure of Eight.

❹ Pull on the loose standing part against the Figure of Eight to tighten the binding around the parcel.

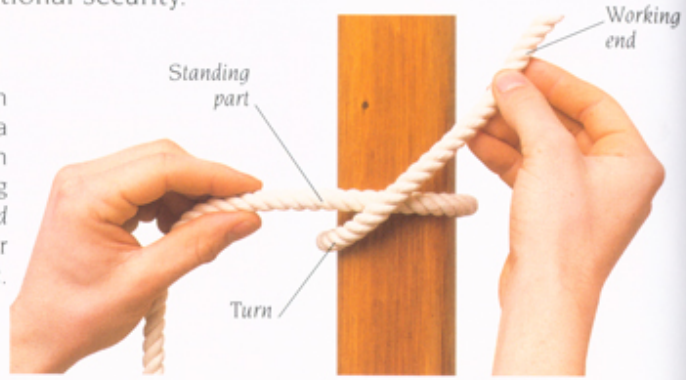


❺ Secure the knot with a finishing half hitch by passing the loose standing part around the short working end, then tucking the loose standing part under itself. The half hitch can also be twitched into place with the fingers and thumb (p. 23).

❻ Pull on the loose standing part against the working end to tighten the half hitch and lock the binding in place. Trim (p. 25) the ends of the rope.

CLOVE HITCH

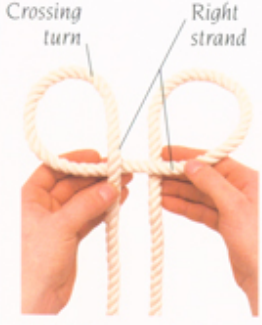
Made up of two *half hitches*, the Clove Hitch is one of the most commonly tied binding knots. It can be used in a number of ways and forms the basis of many other knots. As well as functioning as a binding knot, the Clove Hitch can be tied around stakes to rope off an area. It should be used only as a temporary mooring knot, leaving a long loose end, or tying a half hitch around the *standing part* for additional security.



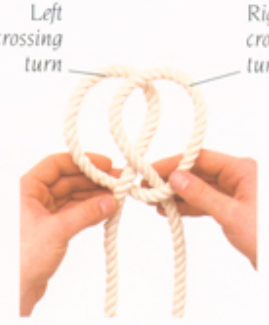
❶ Pass a length of rope around a pole to form a *turn*, crossing the *working end* of the rope over its *standing part*.

CLOVE HITCH – SECOND METHOD

A quick method of tying a Clove Hitch can be used if the rope is not under strain while the knot is being tied. This method allows the hitch to be passed over the end of a pole, or to be clipped on to a *screwgate karabiner*.

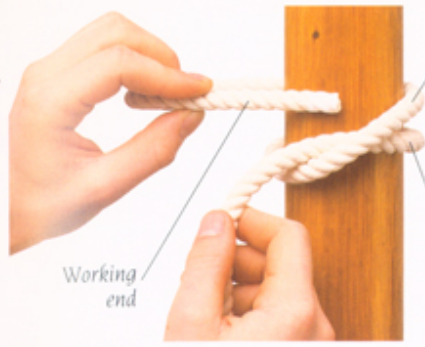


❶ Make a pair of *crossing turns* close to one another. The strand lying on top of each crossing turn should be the right strand of each turn.

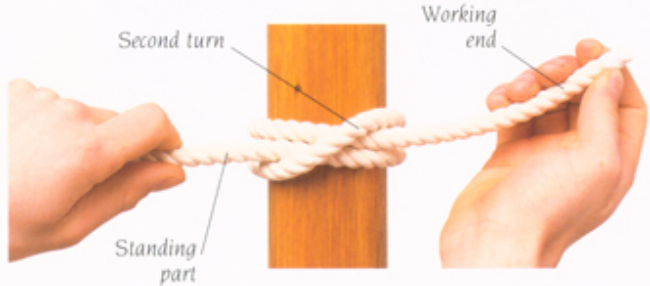


❷ Holding the crossing turns in each hand, slide the right crossing turn over so that it is positioned on top of the left crossing turn.

❸ Pass the crossing turns over the end of a pole. Pull on both ends of the rope to tighten the knot around the pole. Work the Clove Hitch into shape (p. 24).



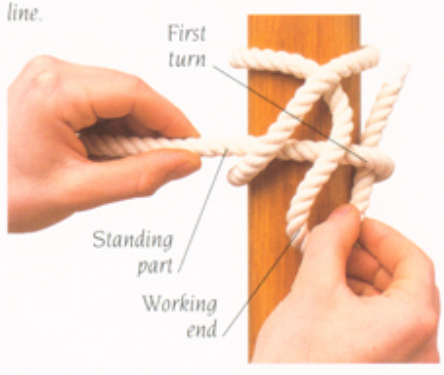
❷ Take the working end around the pole once again, making a second turn in the same direction as the first.



❸ Keeping the rope parallel to the first turn, tuck the working end underneath the second turn. Pull on the working end and on the standing part to tighten the knot.

CONSTRICTOR KNOT

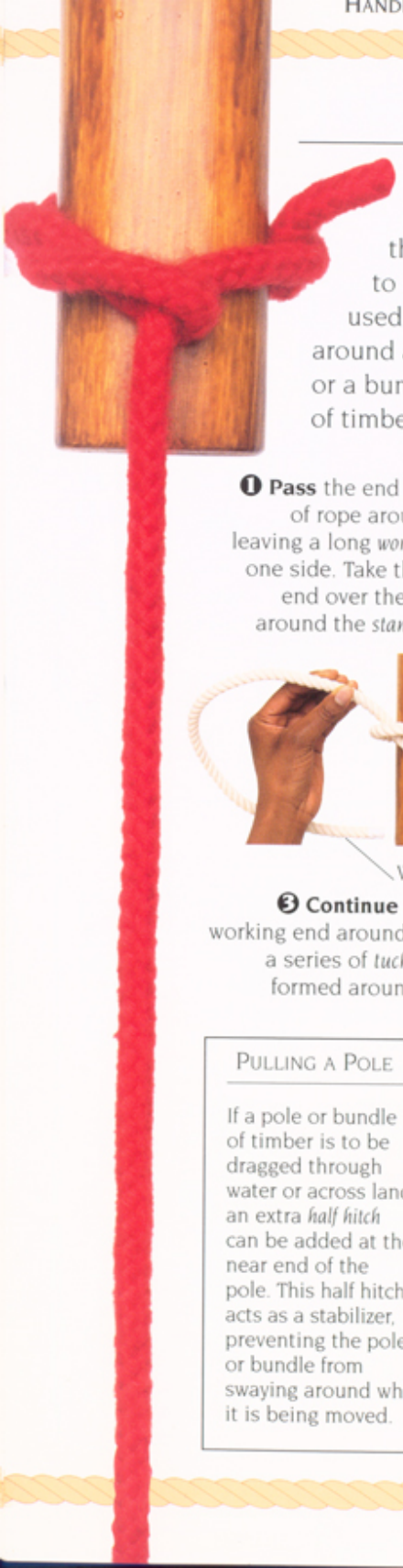
The Constrictor Knot deserves to be more widely known since, tied around almost anything, it will form a tighter binding than the Clove Hitch (above). The final *tuck* of this knot holds the rope in place as the ends are pulled tight. If strain has been put on the rope, it may have to be cut rather than untied. The Constrictor Knot is most effective when tied in *thin line*.

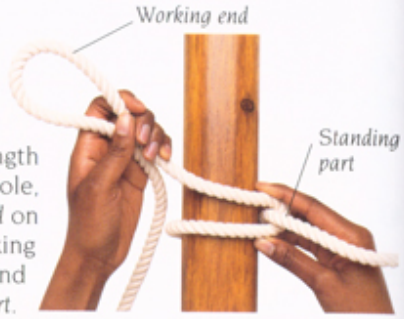


❶ Repeat Steps 1–3 of the Clove Hitch. Before pulling the knot tight, pass the *working end* over, then under the first *turn*. Pull the working end through. Pull tight as for Step 3 of the Clove Hitch.

TIMBER HITCH

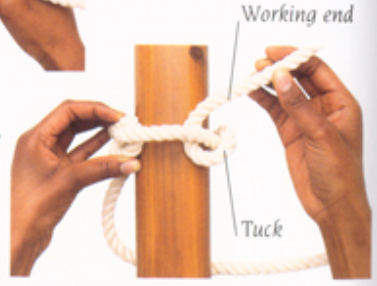
The more strain that is put on the Timber Hitch the tighter it grips, yet it is easy to untie. Traditionally it has been used for tying a length of rope around a log or a bundle of timber.



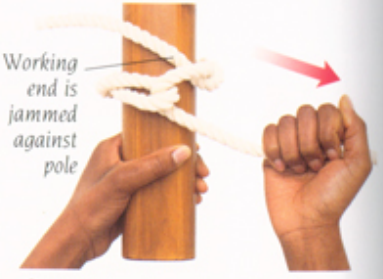


❶ Pass the end of a length of rope around a pole, leaving a long *working end* on one side. Take the working end over the pole and around the *standing part*.

❷ Cross the working end over itself, then tuck it underneath itself, working back around the pole.



❸ Continue tucking the working end around itself until a series of *tucks* has been formed around the pole.



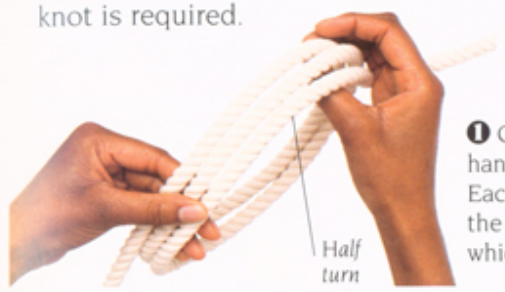
❹ Pull hard on the standing part against the knot to tighten it. Maintain this tension on the rope to keep the Timber Hitch in place.

PULLING A POLE

If a pole or bundle of timber is to be dragged through water or across land, an extra *half hitch* can be added at the near end of the pole. This half hitch acts as a stabilizer, preventing the pole or bundle from swaying around whilst it is being moved.

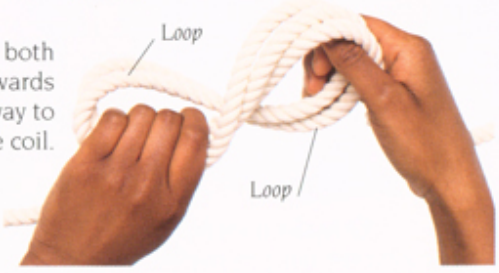
BOA KNOT

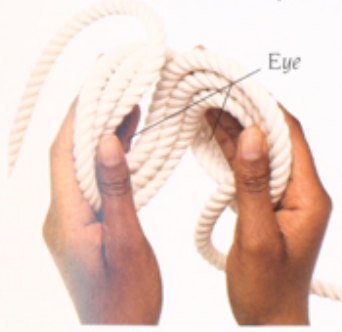
The Boa Knot, slipped over the end of a pole, is simple and ingenious. It can be used instead of the Constrictor Knot (p. 57) if a decorative as well as a practical knot is required.



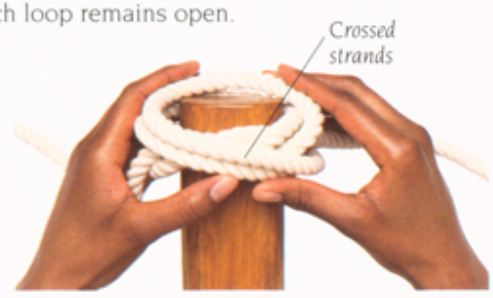
❶ Coil (p. 18) a rope between two hands, making two and a half *turns*. Each turn should be at least twice the diameter of the pole around which the knot will be tied.

❷ Holding the coil in both hands, twist one hand towards you and the other hand away to form two *loops* in the coil.

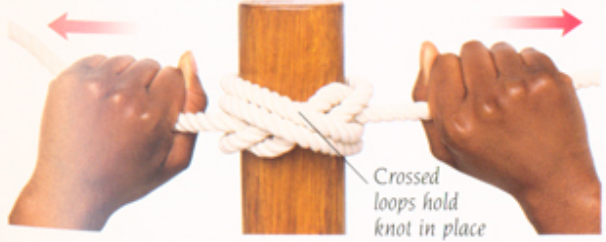




❸ Fold the two loops together, making sure that the *eye* in the centre of each loop remains open.



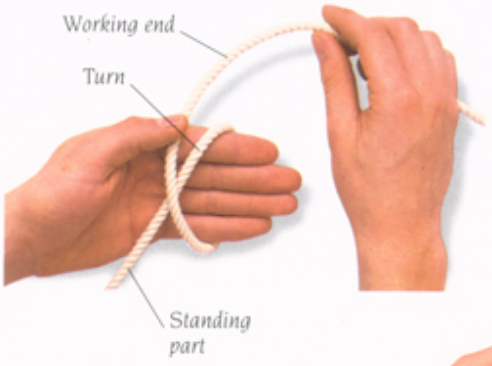
❹ Slide the folded loops over the end of a pole, keeping the crossed strands at the front of the knot.



❺ Work the loops into shape (p. 24), pulling on the strands little by little to tighten them against the pole. Pull on both ends to tighten the knot.

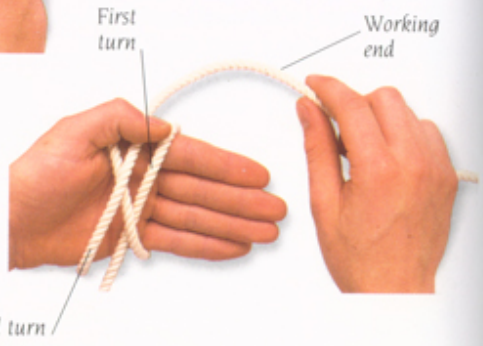
Turk's Head – Three-Lead Four-Bight

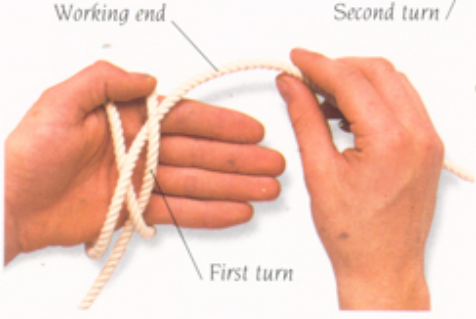
The knots known as Turk's Heads are essentially continuous plaits. *Lead* refers to the number of strands in the plait, and *bight* to the number of curved sides of the finished knot. These decorative knots are usually tied around a pole or hand, but can be flattened to make a small mat.



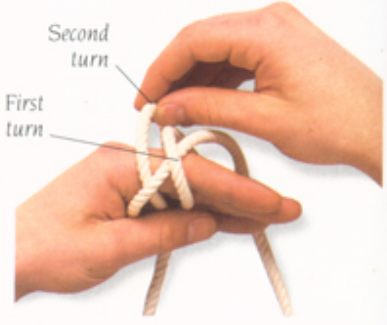
❶ Estimate (p. 22) the amount of rope needed for the knot. Make a *turn* around the palm of one hand, passing the *working end* first over the top of the hand. Cross the working end over the *standing part* from right to left.

❷ Make a second turn around the hand to the left of the first. Cross the working end over the turn from left to right.

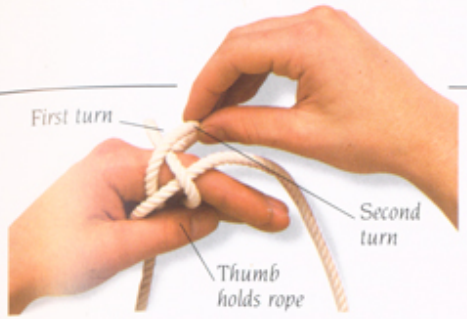




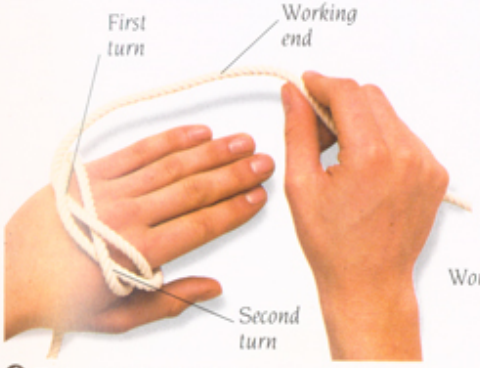
❸ Tuck the working end through the first turn at the top of the hand.



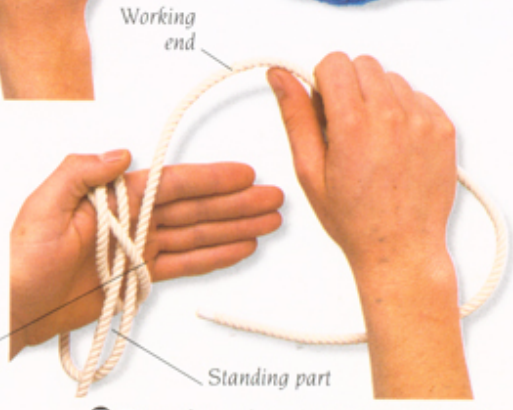
❹ Twist the top of the hand towards the body. Pick up the second turn lying over the back of the hand.



❺ Cross the second turn over the first on the back of the hand. Keep the strands in the palm of the hand in place by holding the thumb over them.



❻ Twist the back of the hand towards the body. Tuck the working end over the second turn, then under the first turn, and pull through. The formation of the three-strand plait is now visible.



❼ Turn the palm of the hand towards the body. Pick up the working end, take it behind the standing part, then tuck it up through the outer right strand below the crossed rope of the first turn.

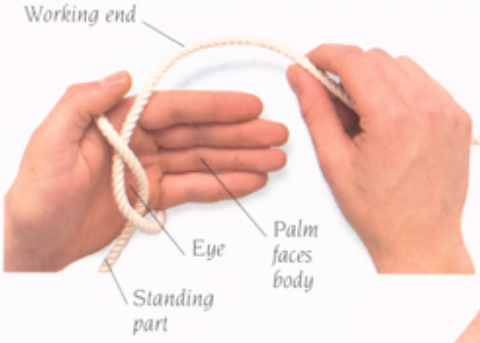
❽ Double (p. 25) the Turk's Head, following the first cycle of tucks with the working end, and ensuring that the strands do not cross. If the finished knot is to be free-standing, *seize* (p. 25) the ends of the rope inside the knot.

Turk's Head: side view

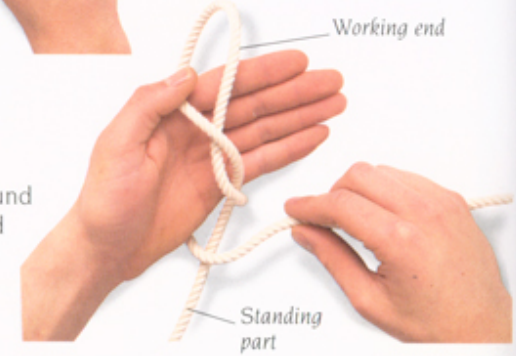
Turk's Head: overview

Turk's Head – Four-Lead Five-Bight

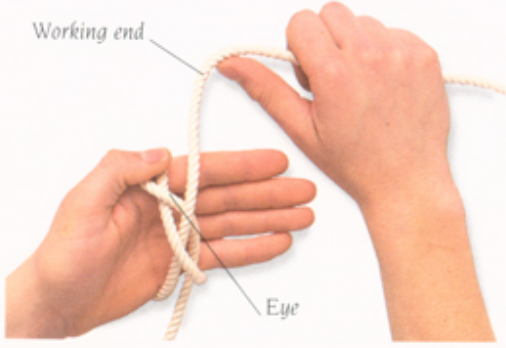
This Turk's Head is based on a continuous four-strand plait. Estimate (p. 22) the amount of rope needed for this knot before starting, and continually adjust the *eyes* between the strands so that they are even.



❶ Pass the *working end* over the palm and around one hand. Take it across the *standing part*, then pass it back under the standing part, leaving a diamond-shaped eye in the centre of the palm.

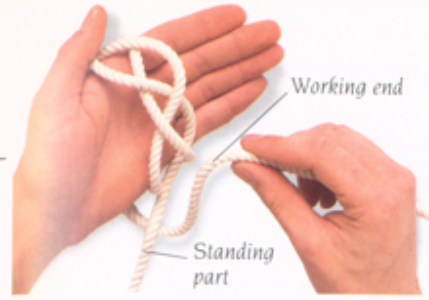


❷ Take the working end around the back of the hand, and bring it up at the front to the left of the standing part.



❸ Tuck the working end up through the diamond-shaped eye from back to front.

❹ Twist the top of the hand towards the body. Continue to weave a plait by tucking the working end over and under the two strands lying on the back of the hand. Leave a gap with two eyes between the working end and the left strand.

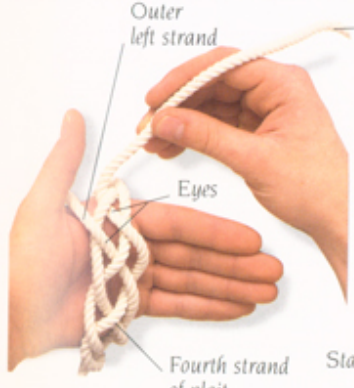


❺ Twist the palm of the hand back towards the body. Bring the working end underneath the hand and over the standing part from right to left.

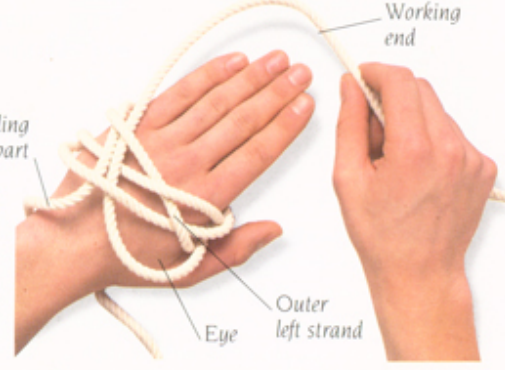
Turk's Head: side view

❻ Weave the working end diagonally from left to right under, over, then under the three strands of the bisected diamond-shaped eye.

Turk's Head: overview



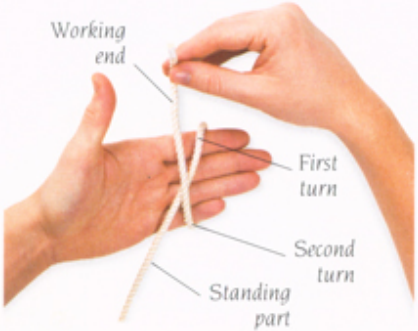
❼ Working from right to left, weave the working end diagonally over and under the next two strands at the top of the hand. Adjust the crossed strands so that the eyes between them are of equal size.



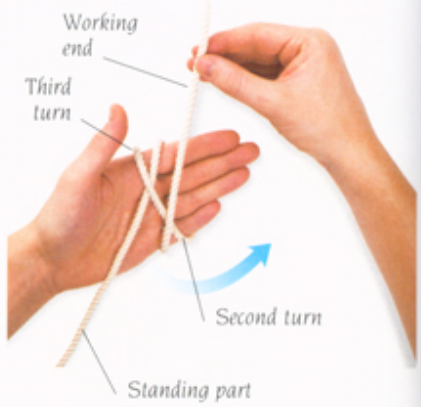
❽ Take the working end over the outer left strand to form a final eye. Turn the back of the hand towards the body, and start to double (p. 25) the knot. Trim and *seize* (p. 25) the ends of the rope.

TURK'S HEAD – FIVE-LEAD FOUR-BIGHT

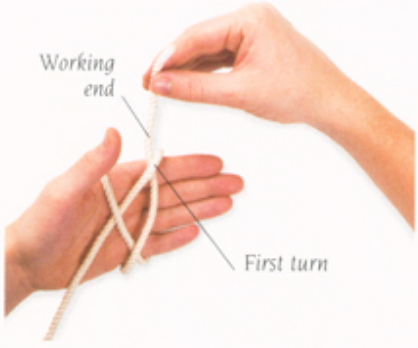
The more complex the Turk's Head, the more care you need to take. Ensure that your passes stay in place; the final full pass locks the overs and unders in place. Once the knot has been tied, it can be doubled (p. 25) or tripled and worked tight into shape (p. 24).



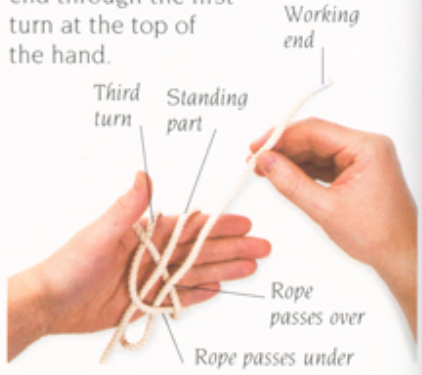
❶ Estimate (p. 22) the amount of rope needed for the knot. Pass the *working end* over the top of the hand to make a *turn*. Make a second turn and cross it over the *standing part* from right to left.



❷ Make a third turn around the back of the hand and bring it out to the right of the standing part. Cross the working end over the second turn from left to right.

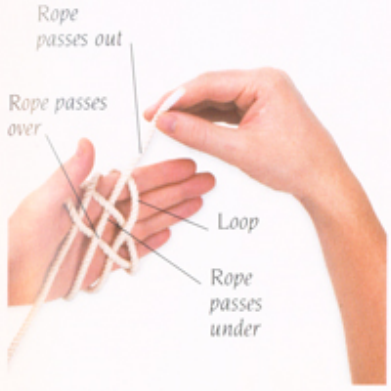


❸ Tuck the working end through the first turn at the top of the hand.

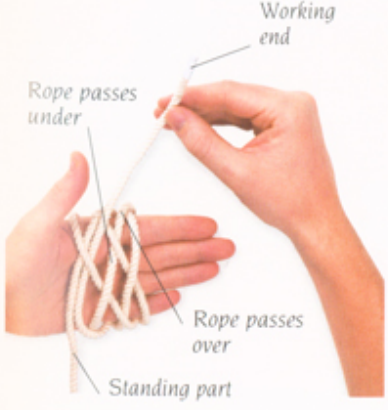


❹ Make a fourth turn around the back of the hand, bringing the working end out on the right of the standing part. Tuck the working end parallel to the standing part, passing under and over the strands from left to right.

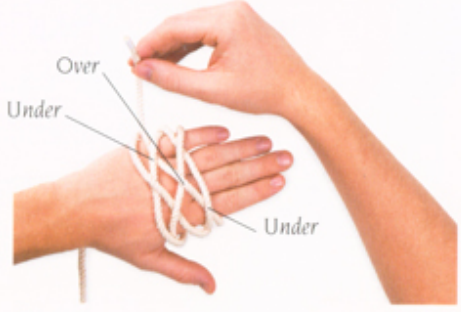
❺ Turn the hand over and tuck the working end over, under, and over the three strands from right to left. Do not lose the loop that has formed around your index finger.



❻ Turn the palm of the hand towards the body. Bring the working end up to the right of the standing part, and tuck it from left to right, passing over, under, and over the loop you had saved.

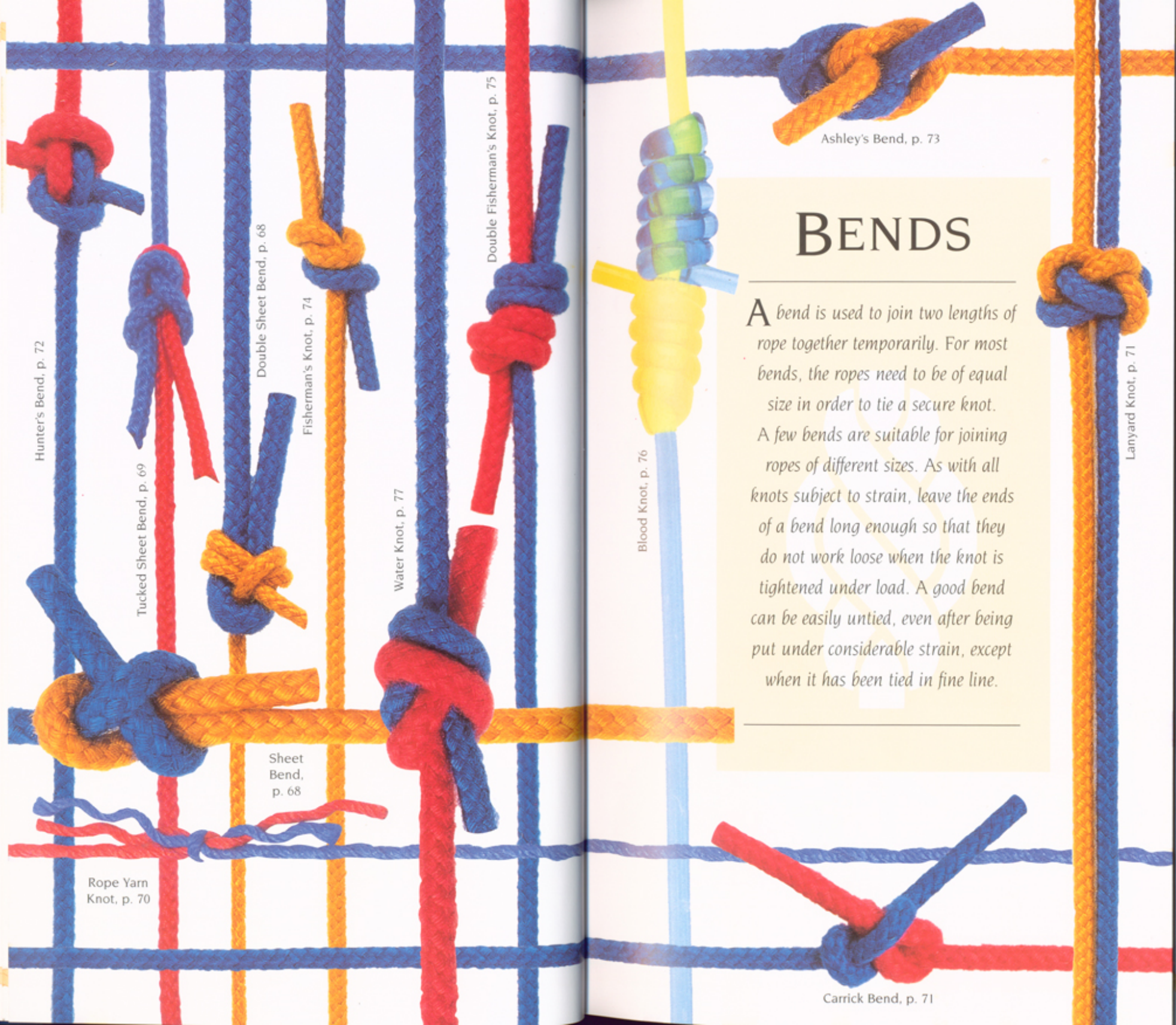


Turk's Head: side view



❼ Turn the hand over, and tuck the working end of the rope from right to left, passing under, over, and under the strands.

❽ Turn the hand back again. Tuck the working end parallel to the standing part, going under and over the strands. Double the knot (p. 25), and *seize* the ends of the rope (p. 25).



BENDS

A bend is used to join two lengths of rope together temporarily. For most bends, the ropes need to be of equal size in order to tie a secure knot. A few bends are suitable for joining ropes of different sizes. As with all knots subject to strain, leave the ends of a bend long enough so that they do not work loose when the knot is tightened under load. A good bend can be easily untied, even after being put under considerable strain, except when it has been tied in fine line.

Sheet Bend

Quick and easy to tie, the Sheet Bend is one of the most commonly used knots for joining two ropes. If the ropes are of unequal diameter, it is preferable to tie a Double Sheet Bend (below).

❶ Fold the end of a length of rope back on itself to form a *loop*. Pass the *working end* of a second rope up through the loop.

❷ Pass the working end of the second rope around the short end of the loop, then behind the first rope.

❸ Bring the working end to the front of the knot, passing it over the long end of the loop, then take it under itself.

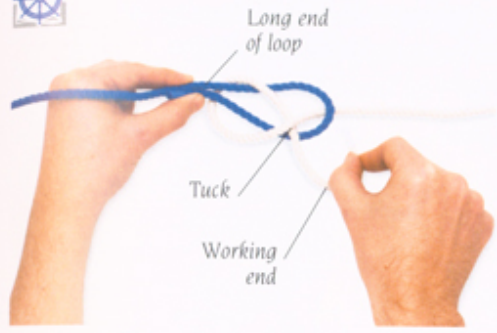
❹ To finish, pull on the loop and on the *standing part* of the second length of rope, locking the knot in place. Trim (p. 25) the working end if required, and *seize* (p. 25) the two ends together.

Double Sheet Bend

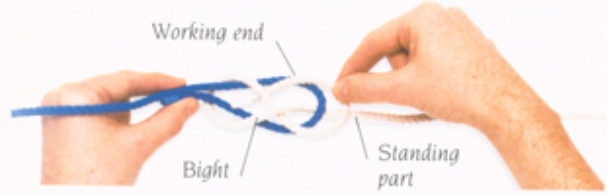
Complete Steps 1–3 of the Sheet Bend (above), using a thin rope as the *working end*. Pass the working end around the *loop* and under itself a second time. Pull tight to secure the knot.

Tucked Sheet Bend

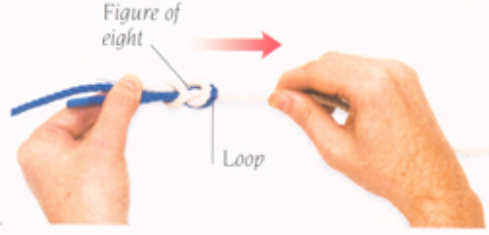
This variation of the Sheet Bend is useful as the ends are tucked against the rope. This ensures that they do not snag if pulled along.



❶ Follow Steps 1 and 2 from the Sheet Bend (opposite). Bring the *working end* to the front, passing it over the long end of the *loop*. *Tuck* it under itself.



❷ Fold the working end back on itself, passing it over the standing part. Tuck it under the *bight* formed by the *tuck* made in Step 1, creating a figure of eight.



❸ Hold the ends and pull the standing part so that the figure of eight sits neatly on top of the loop.

Slipped Sheet Bend

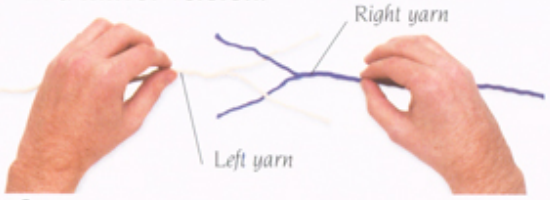
Complete Step 1 of the Tucked Sheet Bend (above). Rather than tucking the *working end* in Step 2, tuck a generous-sized *bight* of the rope under the bight formed by the *tuck* in step 1 while creating a figure of eight. Pull tight to ensure that the bight is securely trapped.

Rope Yarn Knot: tied in hemp

Rope Yarn Knot: tied in cotton

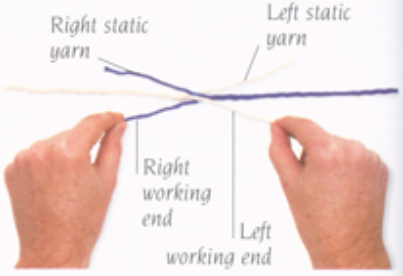
Rope Yarn Knot

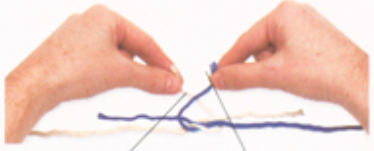
In the past, sailors would take the best of *yarns* from old rope and remake into twice-laid *cordage* by using this knot. It can also be used for joining knitting wools and other materials used in textile projects, and is similar to the Reef Knot (p. 48). The instructions below are for *Z-laid* yarn (p. 10). For S-*laid* yarn (p. 10), the knot should be tied in a mirror version.



❶ **Divide** the fibres that make up each of the *yarns* into two halves. Interlink the lower half of the right yarn behind the lower half of the left yarn, and the upper half of the right yarn over the upper half of the left yarn.

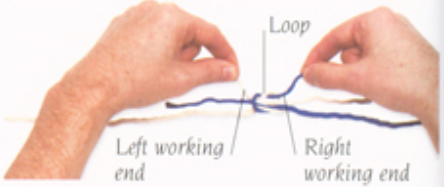
❷ **Push** the interlinked ends close together, but keep the lower halves of the yarns distinct. These are the left and right *working ends* that will form the knot. Leave the other half-yarns static and parallel to the rope yarn.





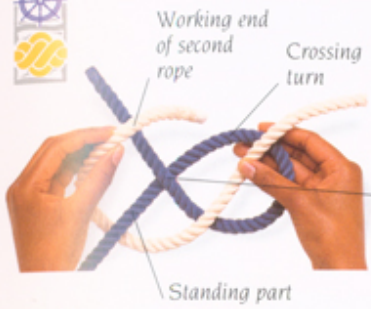
❸ **Bring** the left working end up behind the right yarn and the left static, and the right working end up over the left yarn and the right static. Now cross the right working end over the left working end.

❹ **Tuck** the right working end behind and up through the loop formed by the left working end. Pull both the ends to make the knot sit well.



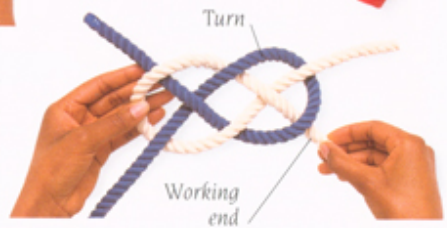
Carrick Bend

This is the knot to use when joining heavy *cable*. It also works well for rope and *line*, and can be allowed to tighten and collapse on itself when strain is taken on the *standing parts*.



❶ **Make** a *crossing turn* with a rope. Pass the *working end* of a second rope under the *standing part* and over the working end of the first rope.

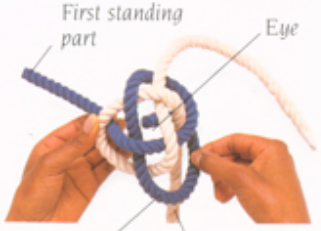
❷ **Pass** the working end of the second rope up through the turn and over itself. Tuck it down through the turn, and pull on all four ends to tighten the knot.



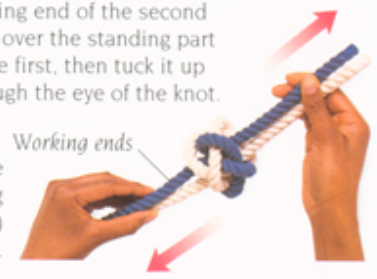
Lanyard Knot

Tucking the *working ends* through the middle of the Carrick Bend (above) produces a knot that can be used as a key fob, zip pull, or whistle strap.

❶ **Complete** Steps 1–2 of the Carrick Bend. Turn the knot over. Take the *working end* of the first rope over the *standing part* of the second rope, and tuck it through the *eye* at the centre of the knot.



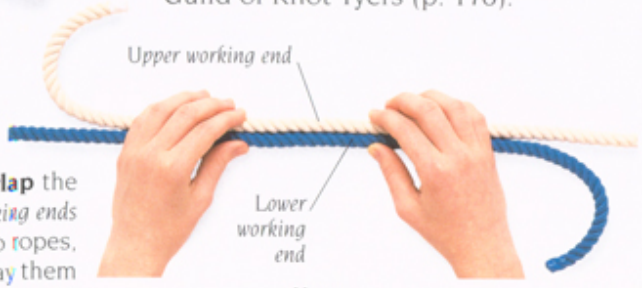
❷ **In** the same way, take the working end of the second rope over the standing part of the first, then tuck it up through the eye of the knot.



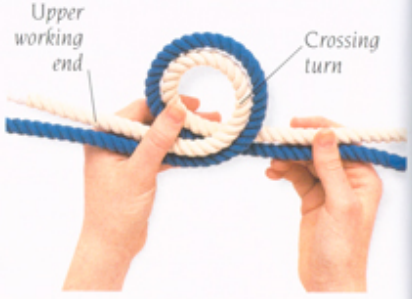
❸ **To** tighten the knot, pull on the standing parts and on the working ends. Work the knot into shape (p. 24) with the fingers or a *marlinespike*.

HUNTER'S BEND

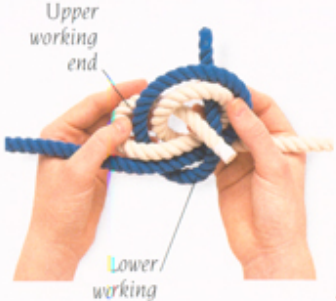
The Hunter's Bend can be used instead of the Sheet Bend (p. 68) to join lengths of slippery synthetic rope. Previously known as the Rigger's Knot, it acquired its new name when it appeared on the front page of *The Times* in the UK in 1978, attributed to Dr Edward Hunter. This publicity for a knot also led to the foundation of the International Guild of Knot Tyers (p. 176).



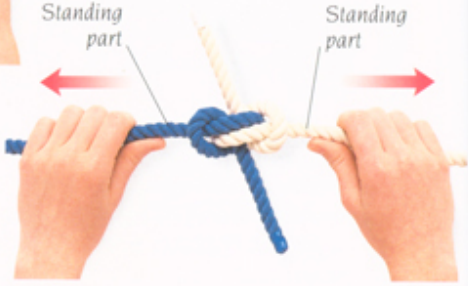
1 Overlap the *working ends* of two ropes, and lay them side by side.



2 Pick up the doubled working ends, then form a *crossing turn*, twisting the strands held in the right hand behind the strands held in the left hand.



3 Tuck the upper working end now held in the left hand through the crossing turn from back to front. Tuck the lower working end held in the right hand through the crossing turn from front to back.

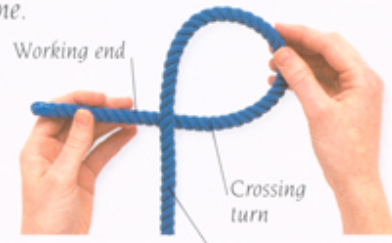


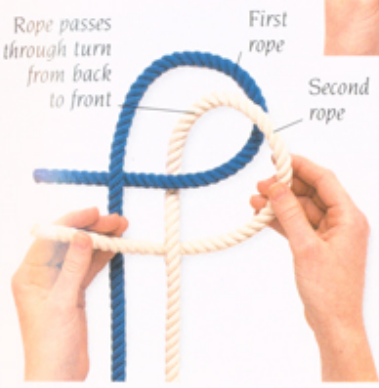
4 Making sure that the working ends remain tucked through the turn, pull on the *standing parts* to tighten the knot.

ASHLEY'S BEND

Ashley's Bend is easily untied, yet it is also one of the most secure bends, even when subjected to a lot of movement. It is particularly useful for tying a bend in *thin line*.

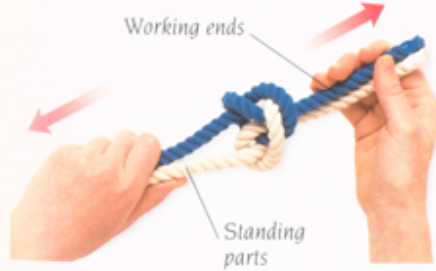
1 Make a *crossing turn*, bringing the *working end* of a rope behind the *standing part*.





2 Make a crossing turn with a second rope in the same way, first passing the working end through the first crossing turn. Lay the working end of the second rope over the standing part of the first.

3 Hold the two crossing turns together, then pass the working ends up through both turns from front to back.

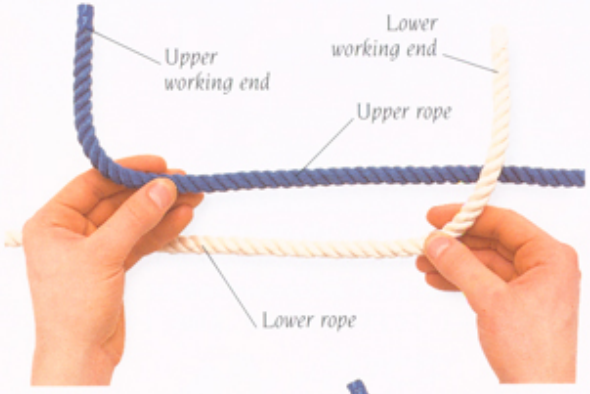


4 Pull on the working ends and on the standing parts to start to tighten the knot.

5 Separate the standing parts, then pull on each one to finish tightening the knot.

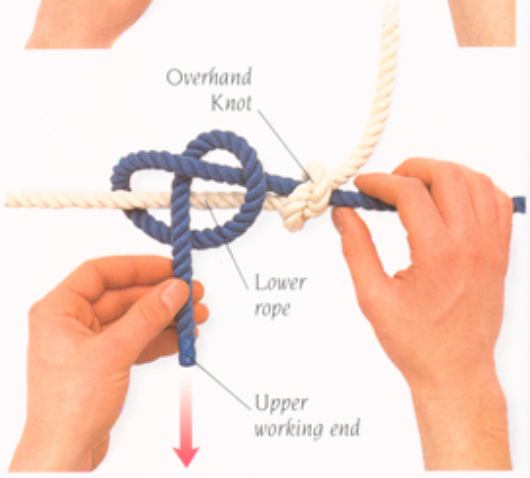
FISHERMAN'S KNOT

The Fisherman's Knot, made up of two sliding Overhand Knots (p. 28), is a simple yet effective knot for tying together two ropes or *lines* of small and equal diameter. It is a favourite with anglers and climbers, who sometimes tape down the ends (below) to prevent them from working loose. The short ends of the finished knot must be at least five times the diameter of the rope.



❶ Bring the *working ends* of two lengths of rope together from opposite sides so that the lengths of rope lie parallel to each other, one above the other.

❷ Pick up the lower working end, and tie an Overhand Knot around the upper rope. Pull the knot tight.



❸ With the upper working end, tie an Overhand Knot around the lower rope. Pull the knot tight.

TAPING ENDS

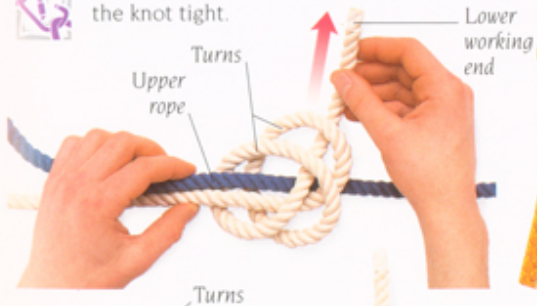
Prevent the short ends of a knot from working loose by taping them down securely with adhesive tape (p. 21).

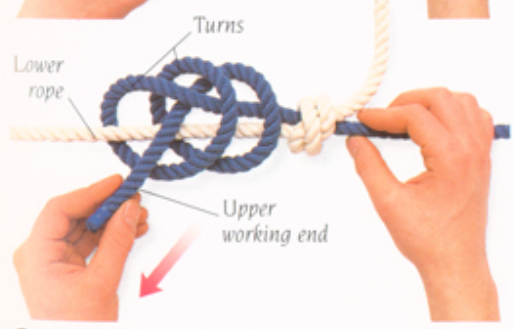
❹ Pull on each length of rope so that the two Overhand Knots slide together and lie snugly against each other. The finished knot may be secured by taping down the working ends (opposite).

DOUBLE FISHERMAN'S KNOT

When using rope or *line* that is particularly slippery, tie a Double Fisherman's Knot to ensure that the knot does not come undone when it is put under strain.

❶ Follow Step 1 of the Fisherman's Knot (opposite). With the lower *working end*, make two *turns* around the upper rope. Pass the lower working end through the turns. Pull the knot tight.

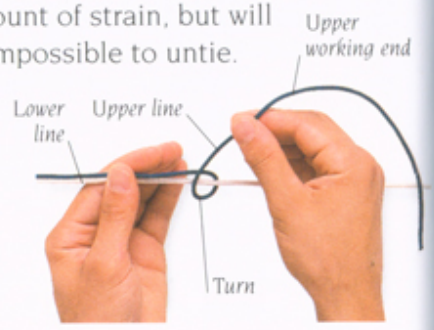




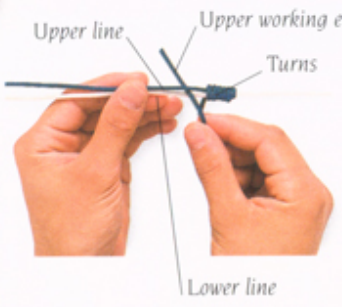
❷ Tie another knot by taking the upper working end and tucking it through two turns made around the lower rope. Tighten and finish the knot as for Step 4 of the Fisherman's Knot.

BLOOD KNOT

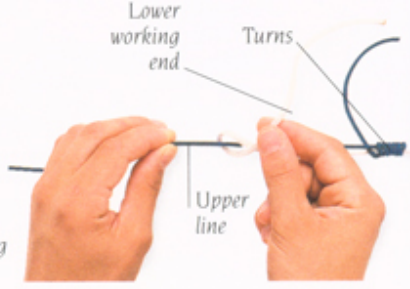
Also known as the Barrel Knot, the Blood Knot is most effective when used to join *thin lines* of equal diameter. It is favoured by anglers for joining nylon line, which can be moistened with saliva to help the knot draw tight. The Blood Knot can withstand a large amount of strain, but will subsequently be almost impossible to untie.



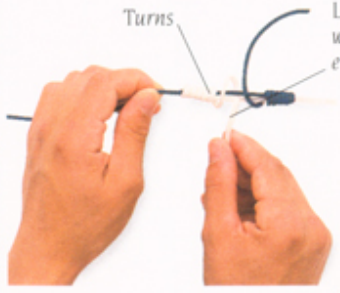
❶ **Overlap** the ends of two lengths of line. Pass the *working end* of the upper line around the lower line to form a *turn*.



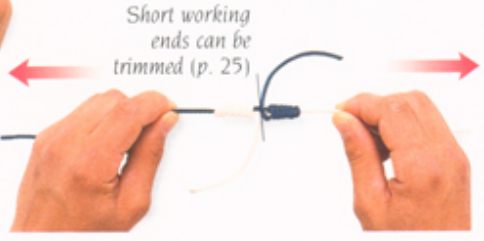
❷ **Make** approximately five turns side by side around the upper and the lower lines to bind them together. Pass the upper working end up between the two lengths of line.



❸ **With** the lower working end, make a turn around the upper line about 8 cm (2½ in) away from the previous set of turns.



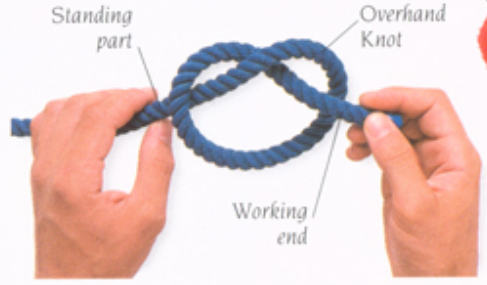
❹ **Make** the same number of turns around the upper and lower lines with the lower working end. Then pass it down between the two lengths of line.



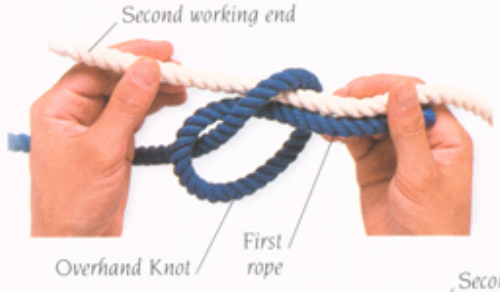
❺ **To** tighten the knot, pull on both lines so that the two sets of turns bed neatly together.

WATER KNOT

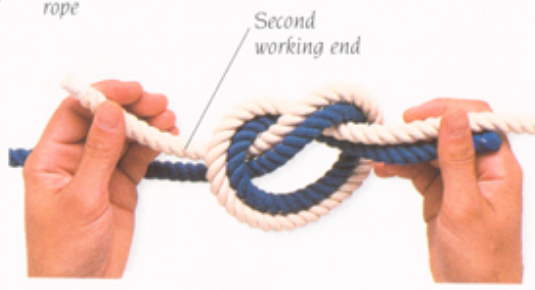
Also known as the Double Overhand Bend or Tape Knot, the Water Knot is strong and reliable. It is the recommended knot for joining flat *tape*, such as that favoured by climbers. Make sure that the second strand of tape or rope always remains on the same side of the first strand as the knot is doubled (p. 25).



❶ **Tie** a loose Overhand Knot (p. 28) at the end of a first length of rope, taking the *working end* over the *standing part*.



❷ **With** the working end of a second rope, follow the end of the first rope into the Overhand Knot, and start to double the knot.

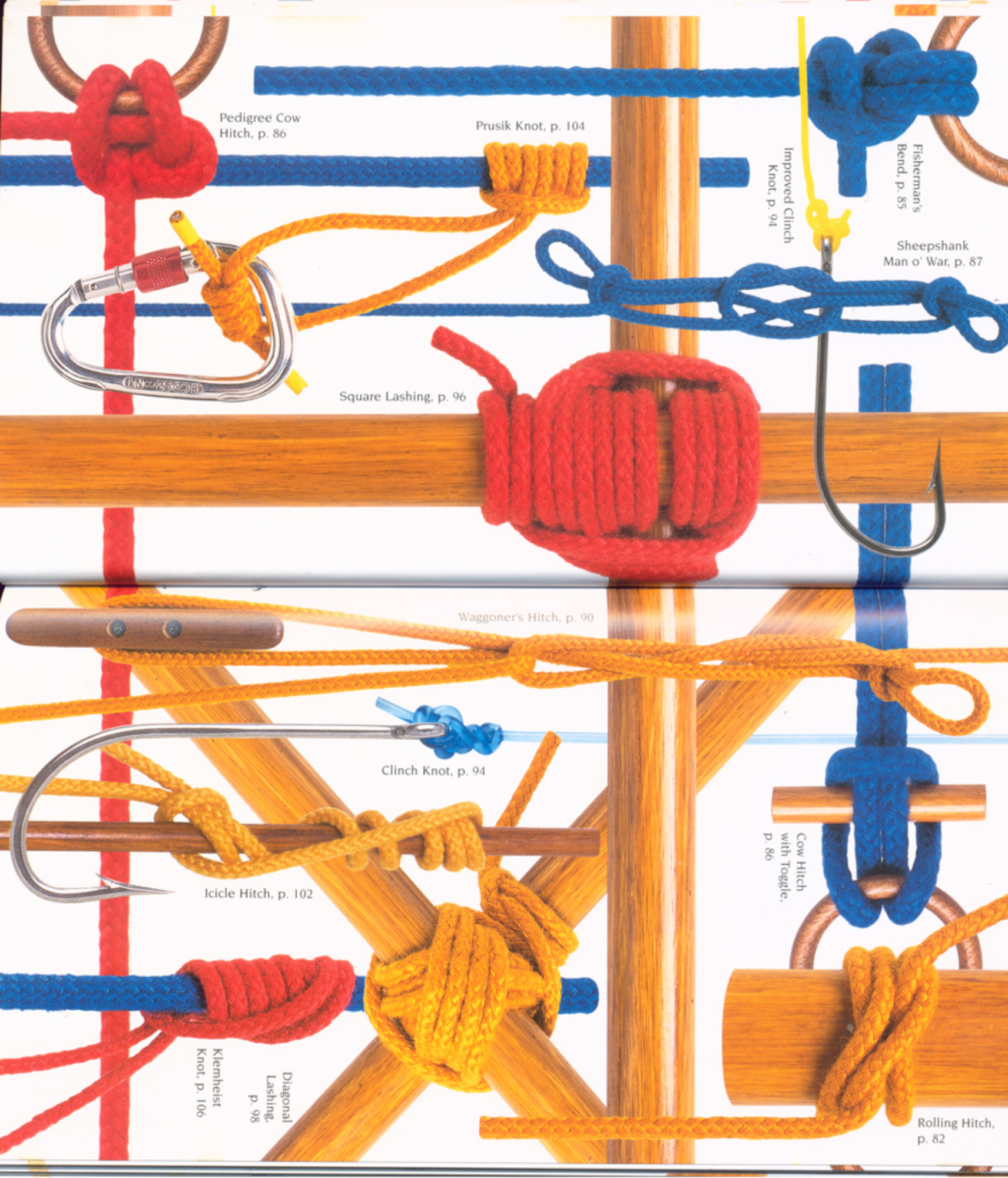


❸ **Continue** to follow the path of the Overhand Knot with the second working end. Make sure that the second rope does not cross over the first.

❹ **To** tighten the Water Knot, pull on the ropes on either side of the knot. Work the knot into shape (p. 24).

HITCHES

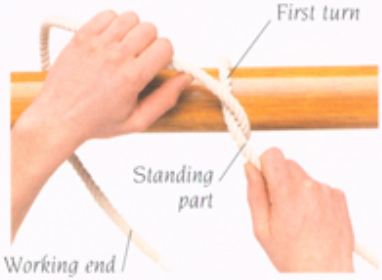
A hitch is used to tie a rope to or around an object, often a pole, a ring, or another rope. Some hitches are designed to be tied quickly, particularly those used by sailors, while others can be untied with a brief tug on one end. When choosing a hitch for a particular task, check that it is suitable for taking strain in the direction required, and make sure that tension is applied to the correct end of the rope once the knot is tied.

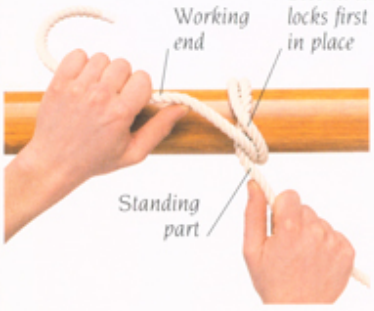

Pedigree Cow Hitch, p. 86
Prusik Knot, p. 104
Improved Clinch Knot, p. 94
Fisherman's Bend, p. 85
Sheepshank
Man o' War, p. 87
Square Lashing, p. 96
Waggoner's Hitch, p. 90
Clinch Knot, p. 94
Icicle Hitch, p. 102
Cow Hitch with Toggle, p. 86
Klemheist Knot, p. 106
Diagonal Lashing, p. 98
Rolling Hitch, p. 82

Rolling Hitch

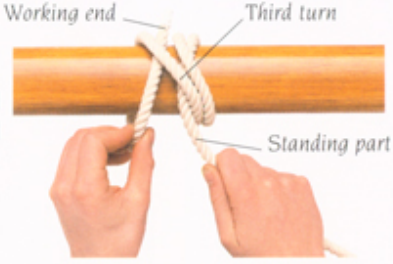
This knot is used to tie a rope to a pole, or to take strain off another rope. Strain can be applied sideways to this knot in one direction. To apply strain in the opposite direction, tie a mirror version of the knot (below).

❶ Make a *turn* around a pole, bringing the *working end* up on the right side of the *standing part*. Take the working end across the standing part.

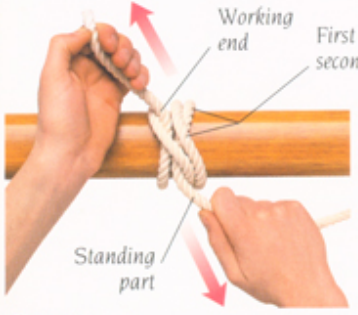




❷ Make a second turn around the pole, bringing the working end up between the second turn and the standing part.



❸ Make a third turn beside the second and across the first. Bring the working end up on the left side of the standing part. Tuck the working end under the third turn.



❹ Pull on the working end and on the standing part to tighten the knot. Take the standing part over the first and second turns before applying strain to the rope.

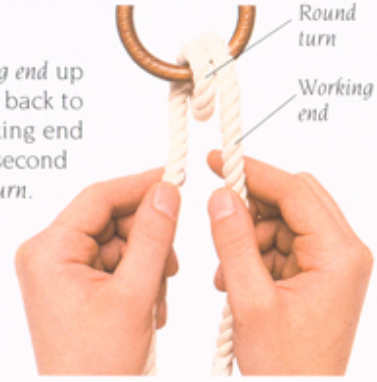
Mirrored Rolling Hitch

To take strain in the opposite direction, follow Steps 1–4 of the Rolling Hitch (above) in reverse, bringing the *working end* up on the left of the *standing part* after both the first and second *turns*, and on the right of the standing part after the third turn.

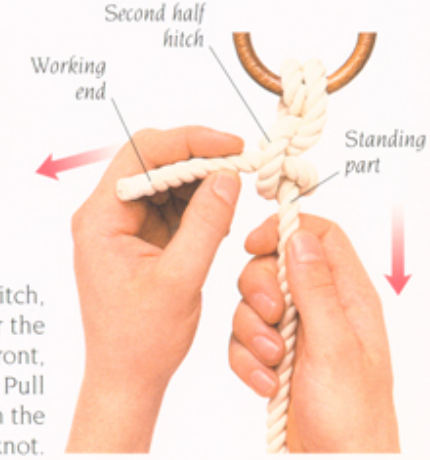
Round Turn & Two Half Hitches

This knot can be used to secure a rope to a pole or ring in a variety of situations, from mooring a boat to tying a washing line. If placed under great strain, it can still be reasonably easily untied. The *round turn* takes any strain applied to the knot, while the two *half hitches* keep the round turn in place.

❶ Bring the *working end* up through a ring from back to front. Pass the working end through the ring a second time to form a *round turn*.



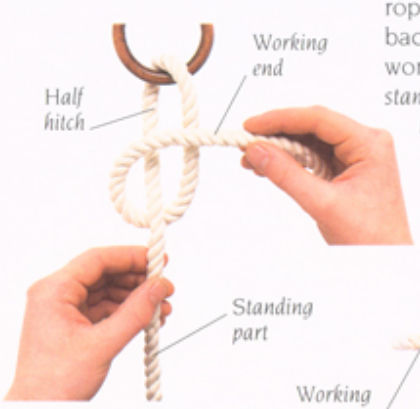
❷ Take the working end across then behind the *standing part*. Bring it to the front of the knot again, and tuck it behind itself to form a half hitch.



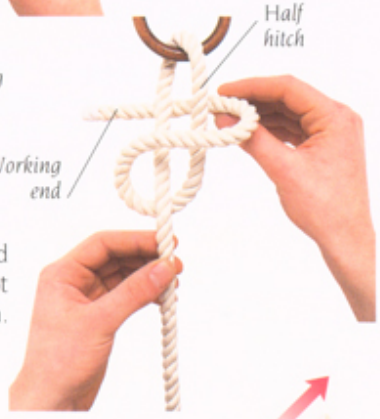
❸ Make a second half hitch, taking the working end under the standing part, around to the front, and tucking it behind itself. Pull on the working end and on the standing part to tighten the knot.

Buntline Hitch

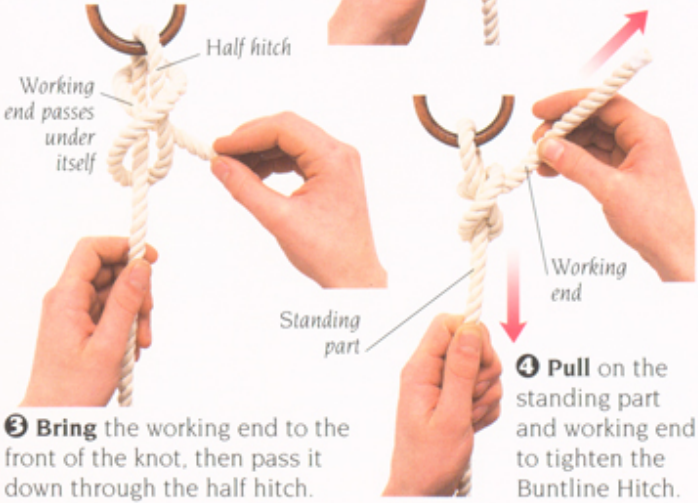
The Buntline Hitch will not come undone, even when subjected to a lot of movement. On square-sailed ships, it was used to secure a line to the Bunt (the middle part of a sail). It can also be used without a ring as a simple knot for a necktie.



❶ **Pass** the *working end* of a rope through a ring from back to front. Take the working end behind the *standing part* to form a *half hitch*. Bring the working end across the front of the half hitch.



❷ **Take** the working end to the back of the knot behind the half hitch.



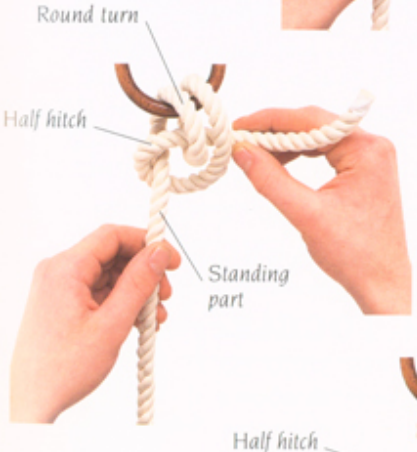
❸ **Bring** the working end to the front of the knot, then pass it down through the half hitch.

❹ **Pull** on the standing part and working end to tighten the Buntline Hitch.

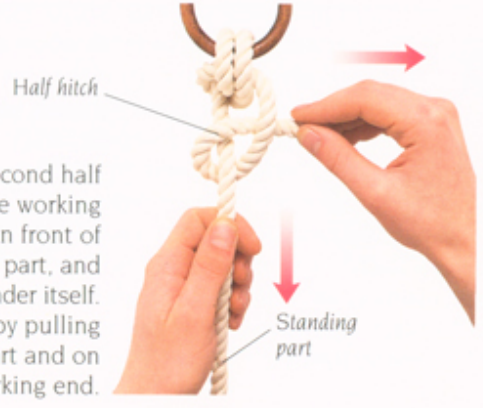
Fisherman's Bend

A hitch, despite its name, this knot is also called the Anchor Bend and is ideal for securing a rope to an anchor or a buoy. It is similar to the Round Turn and Two Half Hitches (p. 83), with the first *half hitch* locked in place by the *round turn*. For additional security, *seize* (p. 168) the short *working end* to the *standing part*.

❶ **Pass** the *working end* of a rope twice through a ring from back to front to form a *round turn*.



❷ **Bring** the working end down and behind the *standing part*. Tuck it through the round turn to form a locking half hitch around the standing part.

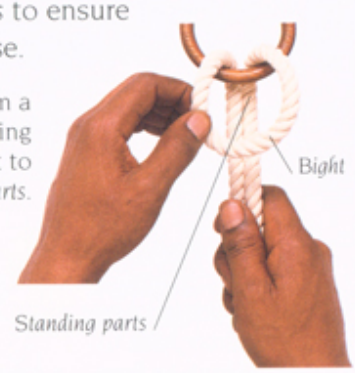


❸ **Make** a second half hitch, taking the working end behind then in front of the standing part, and tucking it under itself. Tighten the knot by pulling on the standing part and on the working end.

COW HITCH

Also called the Lark's Head, the Cow Hitch can be made through a ring or around a pole. Essentially composed of two *half hitches* tied in opposite directions, this is the least secure of all hitches. Equal strain needs to be applied to both *standing parts* to ensure that the knot does not work loose.

1 Double a length of rope to form a *bight*. Pass the bight up through a ring from back to front. Widen the bight to extend either side of the *standing parts*.



2 Pull the standing parts forward through the bight. Pull tight.

PEDIGREE COW HITCH

If only one *standing part* of a Cow Hitch (above) is taking strain, tie a Pedigree Cow Hitch, tucking the second standing part between the *bight* and the ring to secure the knot.

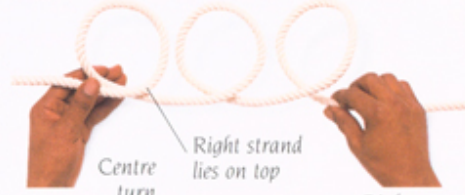
COW HITCH WITH TOGGLE

This variation of the Cow Hitch (above) is used when the two ends of the rope are fixed, and only the *bight* can be passed through the ring. Complete Step 1 as for the Cow Hitch. Insert the toggle over the first strand of the bight, under the two *standing parts*, and over the second strand of the bight. Pull on the standing parts to secure the toggle in the knot. The toggle may have a tail of rope so that it can be pulled out to undo the knot.

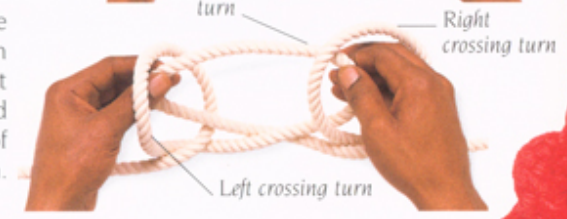
SHEEPSHANK

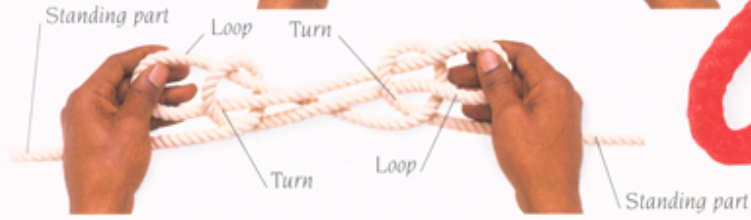
The Sheepshank is designed to shorten a rope without cutting it. It can also be used to relieve strain on a worn part of a rope by positioning the damaged strands in the centre of the knot (p. 17).

1 Make three *crossing turns* all in the same direction.



2 Pull the centre crossing turn through the back of the right crossing turn and through the front of the left crossing turn.

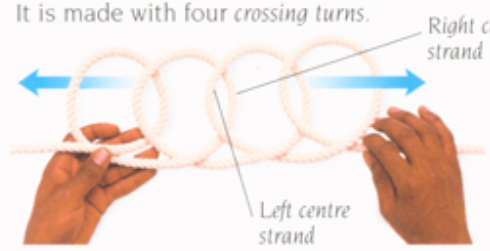




3 Pull on the newly formed *loops*, then on the *standing parts* so that the outer crossing turns tighten around the loops. The knot will only hold if strain is applied to the standing parts.

SHEEPSHANK MAN O' WAR

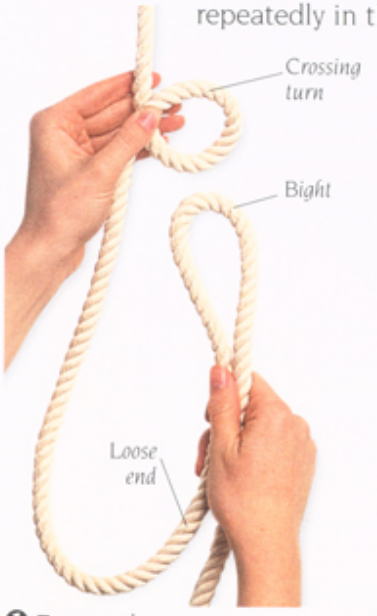
The Man o' War is more secure and more decorative than the Sheepshank (above). It is made with four *crossing turns*.



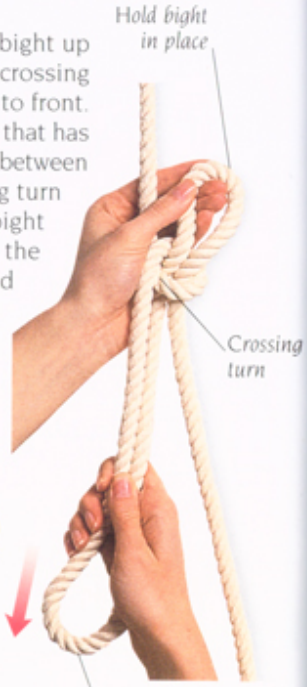
1 Make four overlapping *crossing turns* in the same direction. Pull the right centre strand through the right outer turn from back to front, and the left centre strand through the left outer turn from front to back.

WAGGONER'S HITCH

The Waggoner's Hitch acts as a lever, allowing strain to be put on a length of rope so that loads can be lashed down very tightly. The hitch comes undone as soon as the strain is released, so the knot needs to be properly formed and locked in place. Employed for centuries to secure loads on to wagons, it is still used by lorry drivers. The Waggoner's Hitch can cause severe *chafe* on a rope if the knot is used repeatedly in the same place on the same rope.



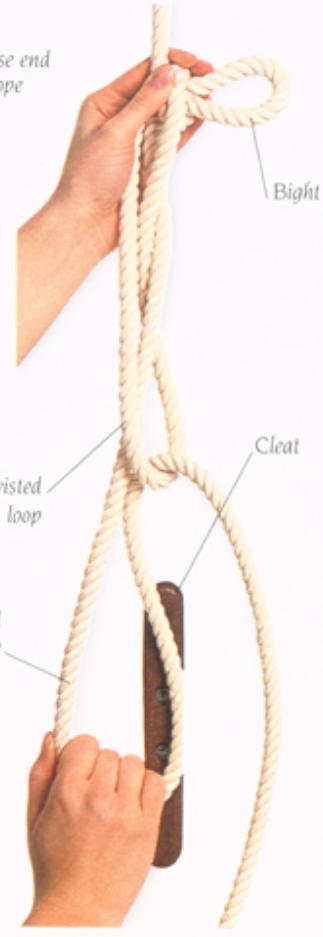
❶ Ensure that the rope is fixed in position at one end. Make a *crossing turn* in the middle of the rope, with the upper strand of the crossing turn lying on top. Form a *bight* with the loose end, leaving a long length of rope between the crossing turn and the bight.



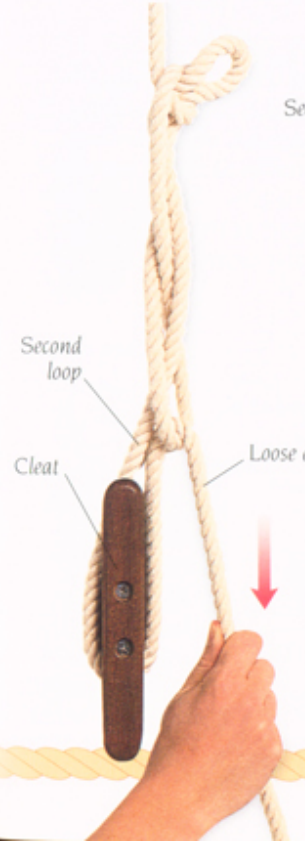
❷ Insert the bight up through the crossing turn from back to front. Pull on the *loop* that has now formed between the crossing turn and the bight to tighten the turn around the bight.

❸ Make two twists in the loop towards the bight and the crossing turn. Make sure that the bight and the turn remain locked in place.

❹ Put one hand through the lower part of the twisted loop, and take hold of the loose end of the rope.



❺ Pull the loose end of rope through the twisted loop to form a second loop. Hook this loop over a *cleat* or *holdfast*, ensuring that the bight remains in place.

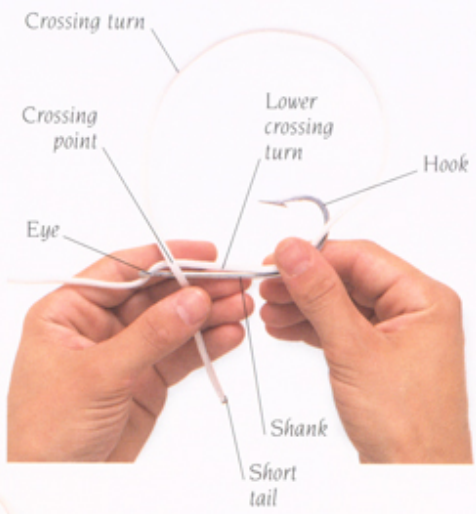


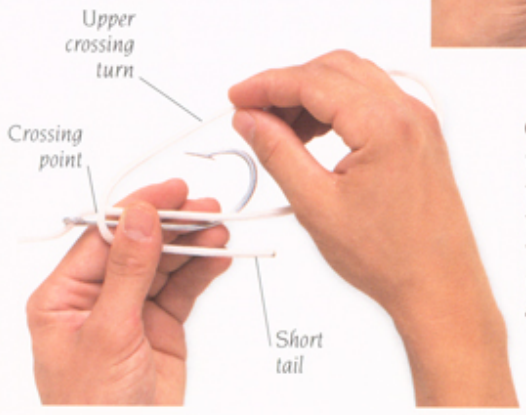
❻ Pull on the loose end of rope to tighten the second loop around the cleat. Strain must be maintained on the loose end to keep the knot in place.

SNELLING A HOOK

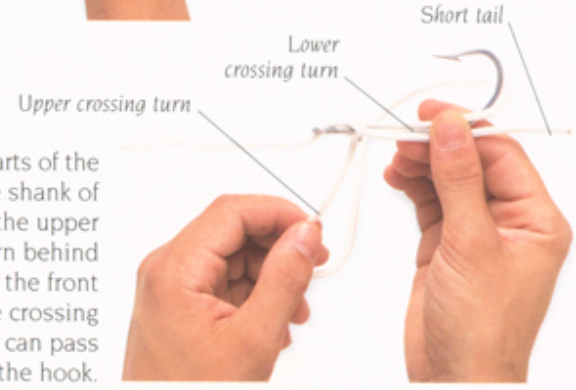
This knot uses many *turns* to bind a *line* to a hook. When tying the knot with monofilament nylon fishing line (p. 13), moisten the line before pulling the knot tight to help the turns slide snugly on top of one another. This method can also be used to tie a line to a hook with a *spade end*.

1 With the point of a hook uppermost, pass the end of a line up through the *eye* of the hook. Pull the line through. Form a large *crossing turn*, taking the line over itself just above the eye. This is the crossing point. Leave a short tail of line below the crossing point. Hold the lower part of the crossing turn parallel to the shank of the hook.

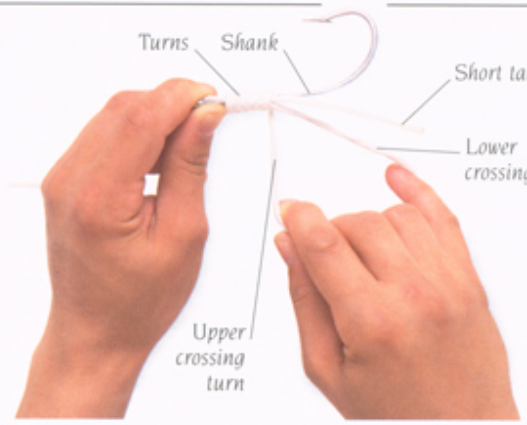




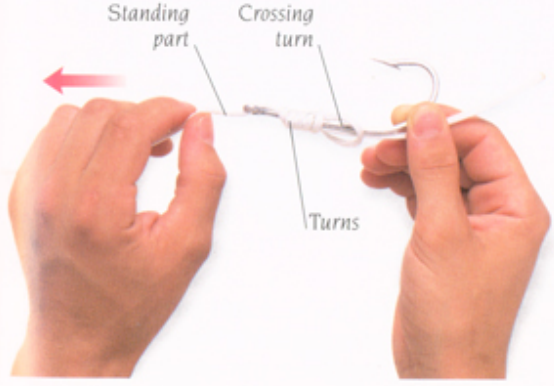
2 Hold the short tail parallel to the shank of the hook, keeping the lower part of the crossing turn parallel to the shank at the same time. Take hold of the upper part of the crossing turn above the crossing point.



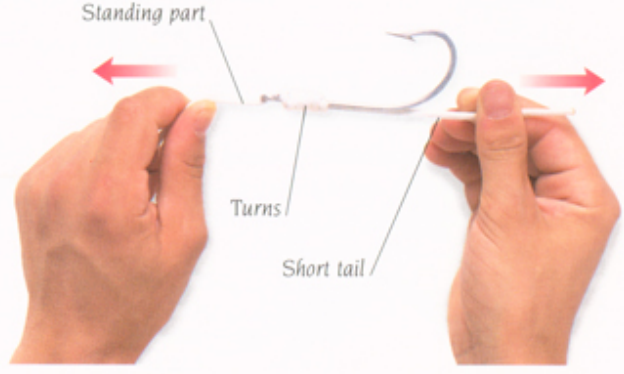
3 Keeping the two parts of the line parallel to the shank of the hook, start to wrap the upper part of the crossing turn behind the shank. Bring it to the front of the hook, keeping the crossing turn open so that it can pass over the point of the hook.



4 Holding the crossing turn open with the fingers, continue to wrap the upper part of the crossing turn around the shank, forming a row of neat *turns*. The lower part of the crossing turn and the short tail should be kept approximately parallel to the shank.



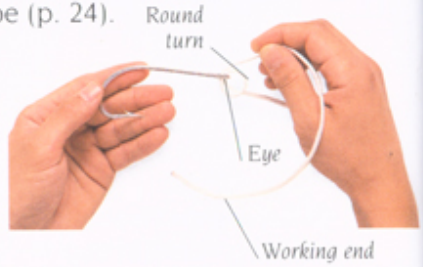
5 Make enough turns to bind the line securely to the shank of the hook. Pull on the *standing part* of the line to tighten the remainder of the crossing turn around the shank.



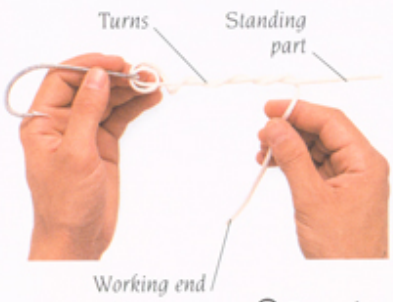
6 To tighten the turns, pull hard on the standing part and on the short tail so that the turns lie side by side around the shank of the hook.

CLINCH KNOT

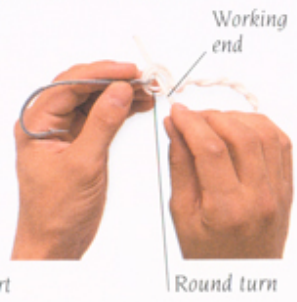
The Clinch Knot can be tied quickly and is one of the easiest knots to use for attaching monofilament nylon fishing *line* (p. 13) to the *eye* of a hook. To help the *turns* tighten snugly on top of each other, moisten the monofilament nylon line before working the knot into shape (p. 24).



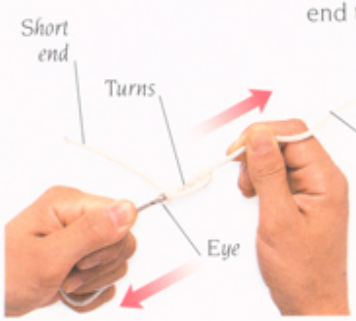
❶ **Pass** the end of a line twice through the eye of a hook to make a loose *round turn*, leaving a long *working end*.



❷ **Wrap** the working end around the *standing part* to make five or six *turns*.



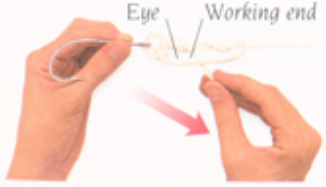
❸ **Pass** the working end through the round turn.



❹ **Pull** on the hook and on the standing part, tightening the turns so that they lie snugly against the eye of the hook. Work the knot into shape, and trim (p. 25) the short end if required.

IMPROVED CLINCH KNOT

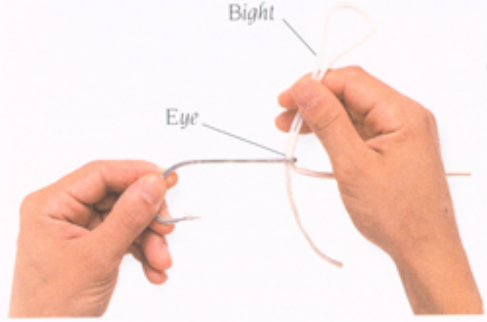
If a monofilament fishing *line* is particularly fine or slippery, make an extra *tuck* to tie an Improved Clinch Knot, which will prevent the knot from working loose.



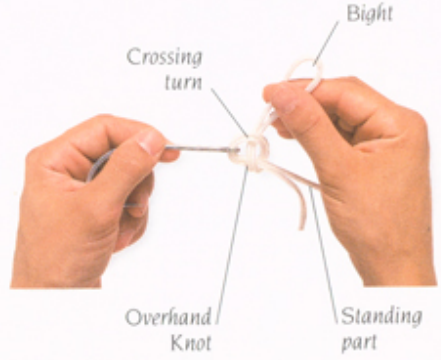
❶ **Complete** Steps 1–3 of the Clinch Knot (above). Tuck the working end through the eye that has formed between the working end and the turns. Pull tight, and trim (p. 25) as for Step 4.

PALOMAR KNOT

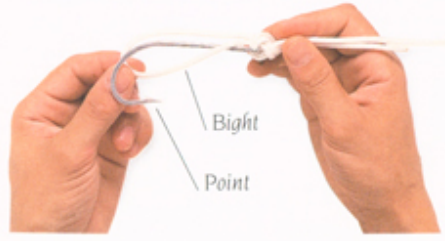
Use the Palomar Knot to tie a fishing *line* to a hook when the line is likely to take a great deal of strain. It is suitable for all types of fishing line. Moisten the line for a neater finish to the knot.



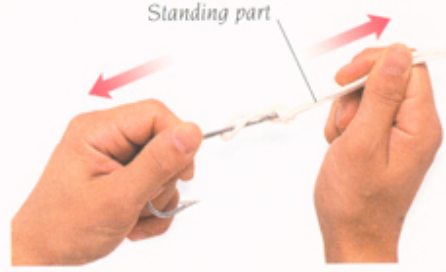
❶ **Double** one end of a line to form a *bight*. Insert the bight through the *eye* of a hook, and pull half of it through.



❷ **Tie** an Overhand Knot (p. 28) with the bight, taking it behind the *standing part*, then inserting it through the *crossing turn* from front to back.



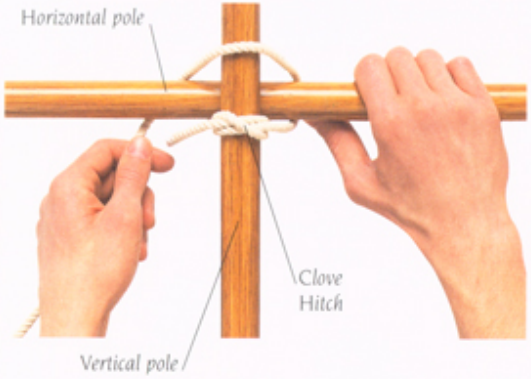
❸ **Pass** the bight over the point of the hook, stretching the line if necessary.



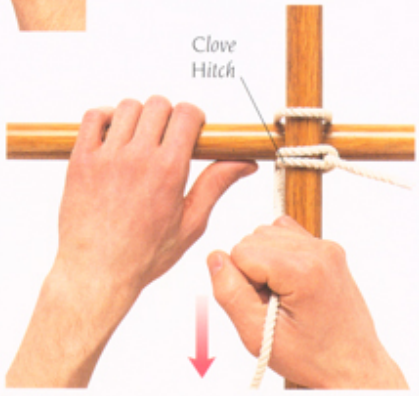
❹ **Pull** on the hook and on the standing part to tighten the knot, moistening the line with saliva to help it slide into place. Work the knot into shape (p. 24).

SQUARE LASHING

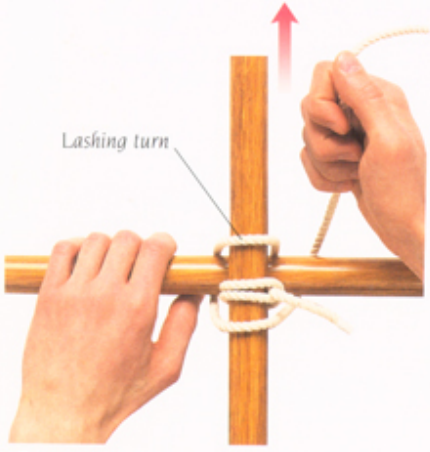
A *lashing* is used to bind two poles together with rope. The Square Lashing is used to hold two poles at a 90-degree angle to one another. To make this lashing as secure as possible, it is important to tighten each *turn* as it is made. *Frapping turns* stablilize the lashing and tighten it further.



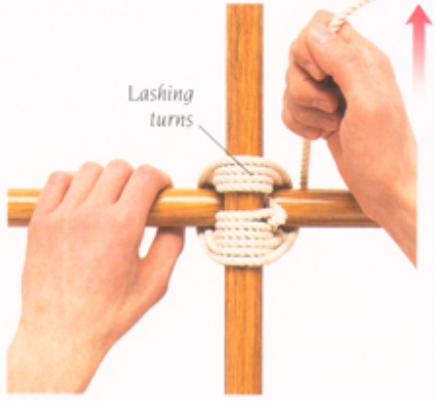
❶ Tie a Clove Hitch (p. 56) to the lower part of a vertical pole laid in front of a horizontal pole. Wind the rope alternately behind then in front of the next two sections of the pole.



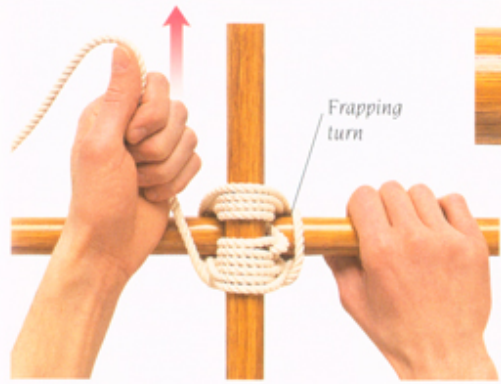
❷ Pull on the rope to tighten it around the poles. The Clove Hitch will slip to one side of the vertical pole.



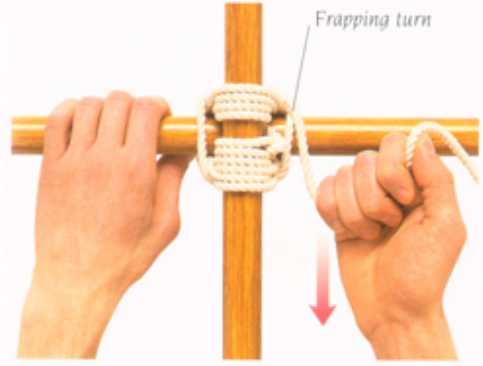
❸ Take the rope over the lower part of the vertical pole then under the next section of the horizontal pole to complete the first lashing turn. Pull the rope tight.



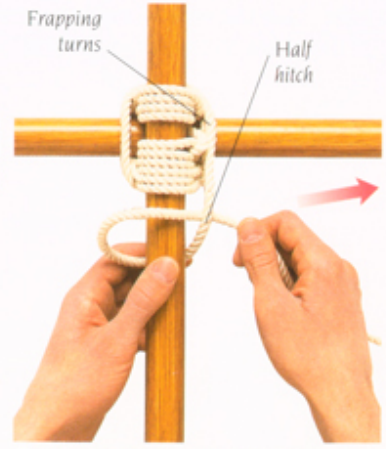
❹ Complete three more full lashing turns around the poles. Pull each one tight as it is made.



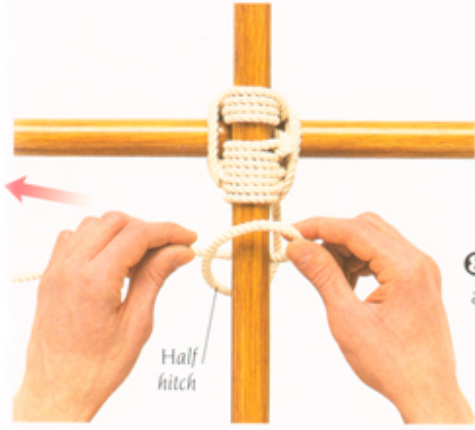
❺ Tighten the lashing with a frapping turn by bringing the rope down over the front of the horizontal pole and behind the lower vertical pole. Pull the frapping turn tight.



❻ Complete the frapping turn, taking the rope in front of the horizontal pole and behind the upper vertical pole. Pull tight.



❼ Make three full frapping turns around the poles. Tie a *half hitch*, taking the rope behind and around the lower vertical pole. Tuck it under itself, and pull tight.

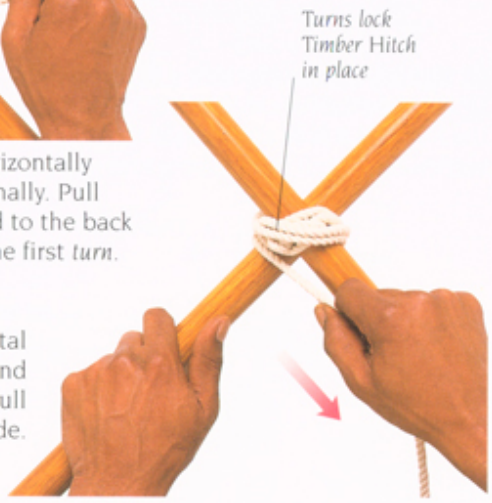


❽ Tie a second half hitch to form a Clove Hitch around the lower vertical pole. Pull tight. If required, trim (p. 25) any excess rope, leaving a long end. Tuck the long end under the lashing.

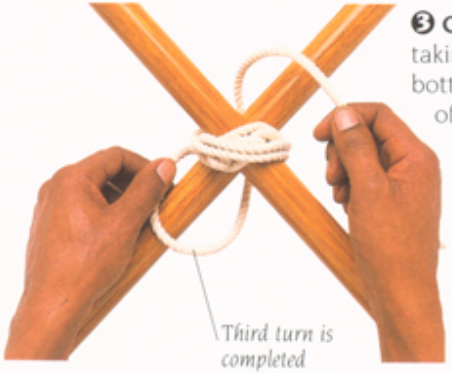
DIAGONAL LASHING

This is the ideal *lashing* for securing diagonal *braces* used to hold a structure rigid. When wooden poles are used for scaffolding, a combination of Diagonal and Square Lashings (p. 96) is used to hold them together. Ensure that you have enough rope (p. 22) to complete the lashing.

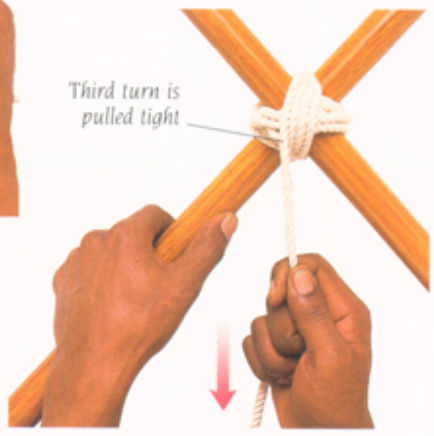
❶ Tie a Timber Hitch (p. 58) horizontally around two poles crossed diagonally. Pull tight. Take the *working end* around to the back of the poles in preparation for the first *turn*.



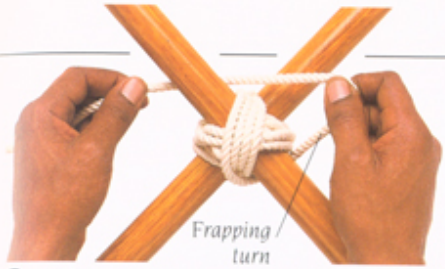
❷ Make three full horizontal turns around both poles and over the Timber Hitch. Pull each turn tight as it is made.



❸ Change the direction of the turns by taking the rope behind the poles at the bottom of the lashing, then to the front of the poles at the top.



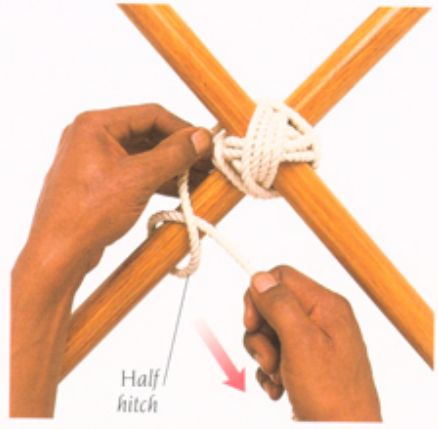
❹ Make three vertical turns around the crossed poles, tightening each turn before making the next one.



❺ Tighten the lashing with a *frapping turn* by threading the rope alternately behind then in front of each pole. This will help to secure the lashing.

❻ Pull the rope tight to complete the first frapping turn around the lashing. Make two more frapping turns, pulling each one tight as it is completed.

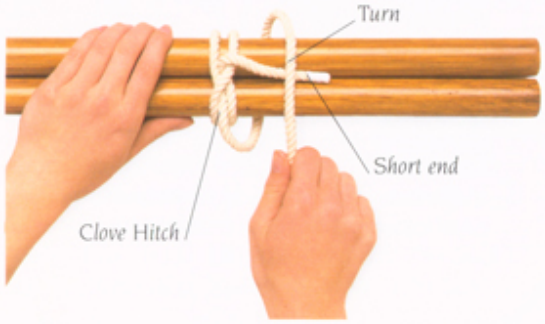
❼ Tie a *half hitch* around one of the lower poles. Slide the half hitch up the pole against the lashing, then pull it tight from below.



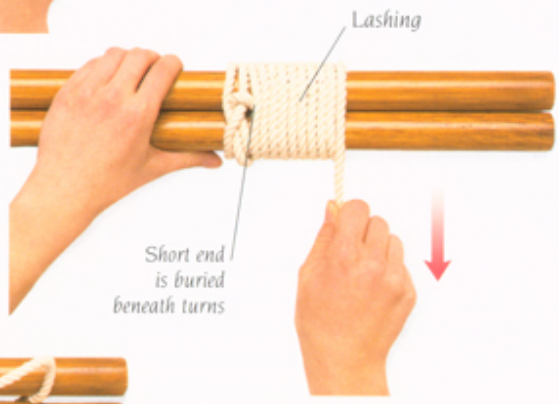
❽ To form a finishing Clove Hitch (p. 56), make a second half hitch, and pull it tight against the lashing from above the pole. Trim (p. 25) the rope, leaving a short end to prevent the knot from working loose.

SHEER LASHING

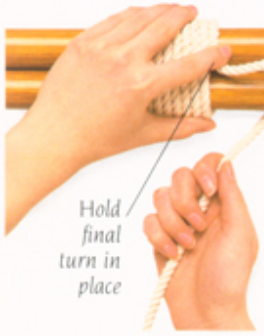
This *lashing* is often used to bind adjacent poles together. It is also an effective way of adding reinforcing timber to the side of a weak or broken pole. The *frapping turns*, used to tighten the lashing, may be left out and replaced with wedges inserted between the poles. A loose Sheer Lashing made around the ends of two poles will allow the poles to be opened out and used as an A-frame (below right).



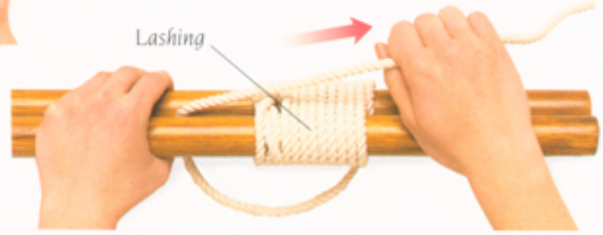
❶ Tie a Clove Hitch (p. 56) around two poles laid side by side. Pull tight. Pass the rope around the poles to form a first *turn*. Trap the short end of the Clove Hitch under the turn.



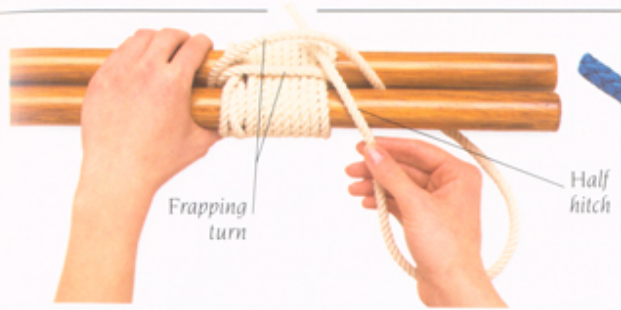
❷ Pulling each turn tight as it is made, make a series of turns until the lashing is at least as long as the combined diameters of the two poles.



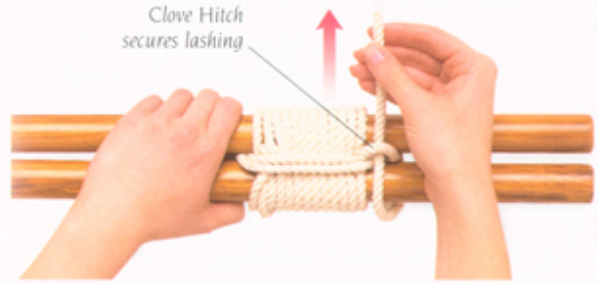
❸ To tighten the lashing with frapping turns, take the rope down between the two poles at one end of the turns. This should be difficult to do if the turns have been pulled tightly enough.



❹ Bring the rope back up between the poles at the other end of the lashing. Pull tight.



❺ Take the rope twice across each side of the lashing to complete two full frapping turns. Pass the rope down between the poles, then around one pole. Tuck it under itself to form a *half hitch*.



❻ Pull the first half hitch tight. Make a second half hitch, forming a finishing Clove Hitch, by taking the rope around the same pole and tucking it under itself. Pull tight, and trim (p. 25) the end of the rope.

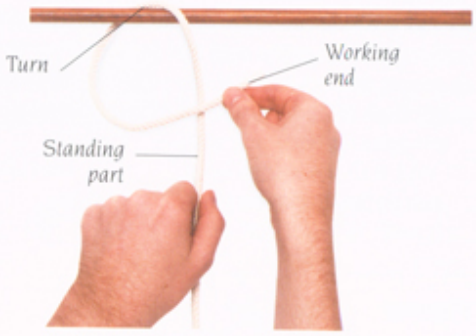
TYING AN A-FRAME LASHING

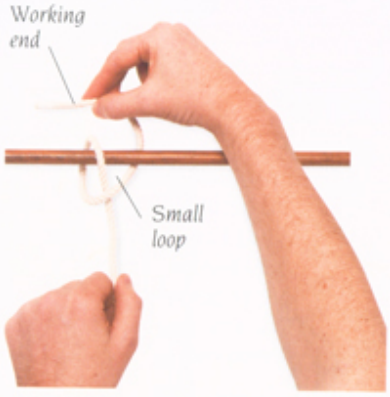
Also known as "Sheer Legs", an A-Frame Lashing is made in the same way as a Sheer Lashing (opposite), with the *lashing turns* and the *frapping turns* made slightly loose so that the poles can be opened out. It is often used to raise a boat mast or to form the legs of a rope bridge, although care must be taken that the feet of the frame do not slip.

Icicle Hitch

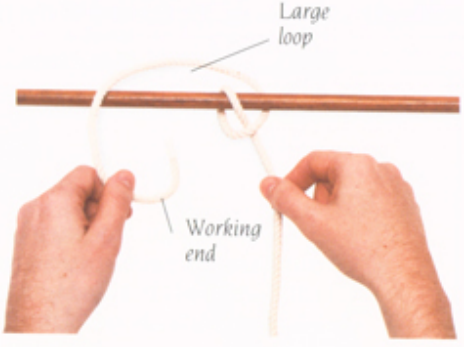
When properly adjusted, this special hitch has strong holding power and a much better grip than the Rolling Hitch (p. 82). For very smooth surfaces, make more *turns*, and hold the knot in place with your hand as strain is applied until the hitch has held.

1 Make a *turn* around a rod, taking the *working end* to the left of the *standing part*. Cross it over the standing part.

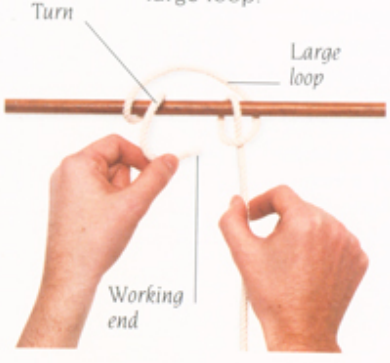




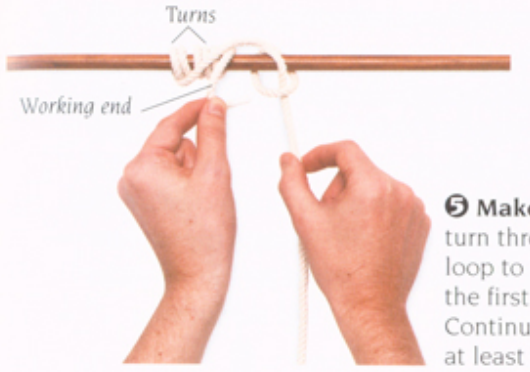
2 Take the working end to the right and behind the rod. Keep this small *loop* distinct for the rest of the hitch.



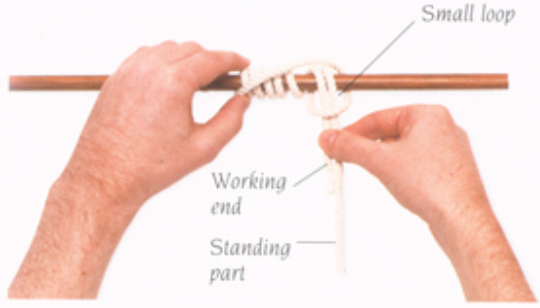
3 Bring the working end of the rope over the rod, leaving a large loop.



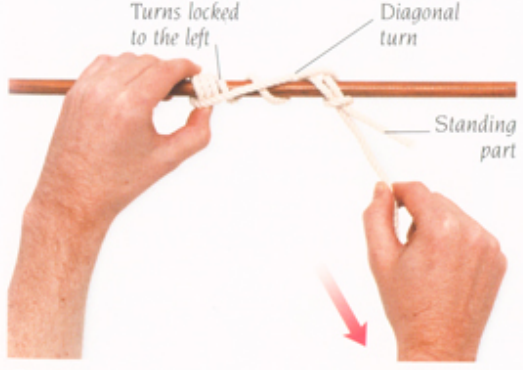
4 Take the working end through the large loop to make a turn around the rod.



5 Make another turn through the loop to lay alongside the first turn. Continue to make at least six turns.



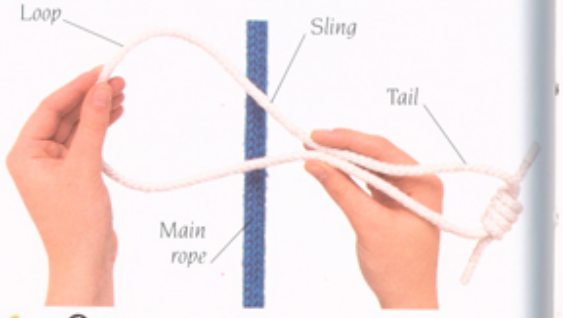
6 Tuck the working end down through the small loop formed in Step 2 and feed slack to the working end before pulling gently on the working end and standing part.



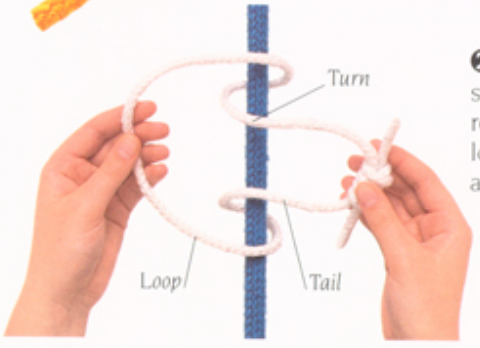
7 Put the full strain on the working end to fully tighten and prepare it for use. Make sure that most of the turns are locked to the left under the diagonal turn.

PRUSIK KNOT

This knot was created for climbers by Dr Carl Prusik in 1931. It binds a *sling* to a main rope, which must be at least twice the diameter. The knot grips the main rope when strain is applied to the tail of the sling, yet allows the sling to slide when the knot is loosened. A series of Prusik Knots can be used as handholds and footholds for climbing a rope. Always check that the finished knot is secure and will hold under strain, especially in icy or wet conditions.

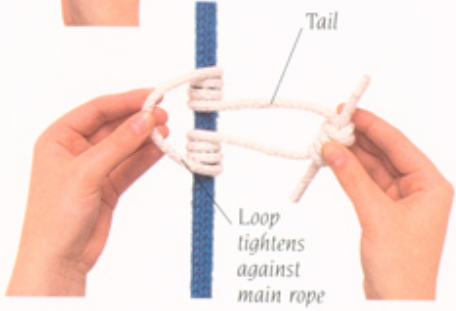


❶ **Open** out a *loop* at one end of a sling, and lay the loop on top of the main rope.



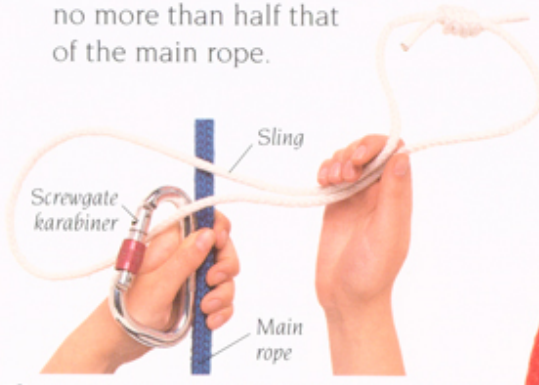
❷ **Pass** the tail of the sling behind the main rope then through the loop to form the first *turn* around the main rope.

❸ **Wind** the tail at least three times around the main rope and through the loop, pulling on the tail to shorten the loop as each turn is made. Apply strain to the tail of the sling to tighten the knot.



BACHMANN KNOT

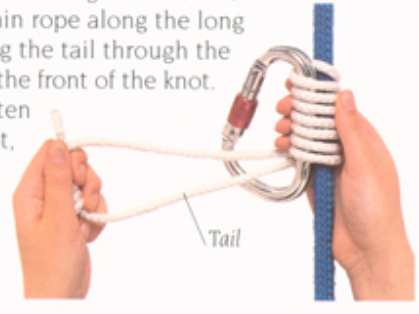
A *screwgate karabiner* allows this knot to be moved easily along the main rope when it is loosened. When strain is applied to tighten the knot, it should only be applied to the *sling*, and never to the karabiner. The diameter of the sling should be no more than half that of the main rope.



❶ **Clip** a screwgate karabiner on to a sling. Lay the sling on top of the main rope, and hold the long side of the karabiner against the main rope.

❷ **Wind** the tail of the sling around the main rope and the long side of the karabiner to bind them loosely together.

❸ **Continue** binding the karabiner to the main rope along the long side. Bring the tail through the karabiner to the front of the knot. To tighten the knot, apply strain to the tail of the sling.

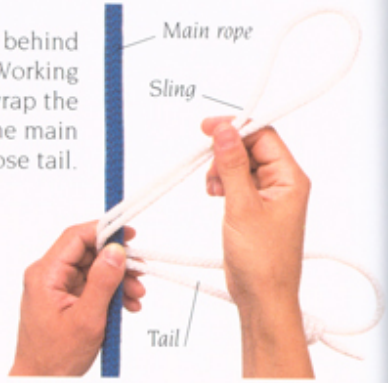


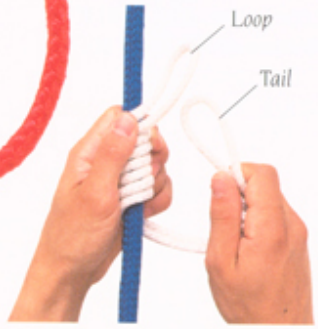
❹ **To** slide the knot along the main rope, release the strain on the tail of the sling, and use the karabiner to move the knot.

KLEMHEIST KNOT

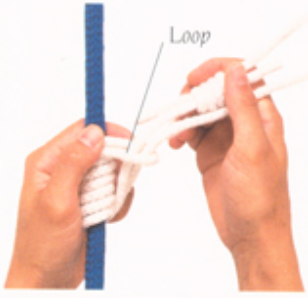
The second rope used in this variation of the Prusik Knot (p. 104) must be no more than half the diameter of the main rope. Soft tubular *tape* may be used instead, since it provides a better grip. Ensure that the *turns* lie snug and even, and test the knot before it is used to take strain.

❶ Pass a *sling* behind the main rope. Working upwards, start to wrap the sling around the main rope, leaving a loose tail.

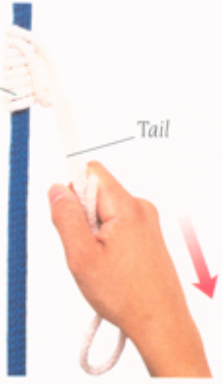




❷ Continue to wrap the sling tightly and evenly around and up the main rope until a small *loop* is left at the end of the sling. Hold the loop against the front of the main rope. Pick up the loose tail of the sling.



❸ Pass the tail of the sling up through the loop held against the main rope.

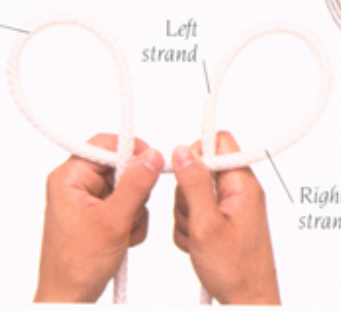


❹ To lock the knot in position, apply a downward strain to the tail of the sling.

ITALIAN HITCH

Climbers use this sliding hitch because it will absorb the energy and control the distance of a fall. The Italian Hitch can also be used for abseiling.

❶ Make a pair of *crossing turns*, laying the right strand of each crossing turn on top of the left strand.



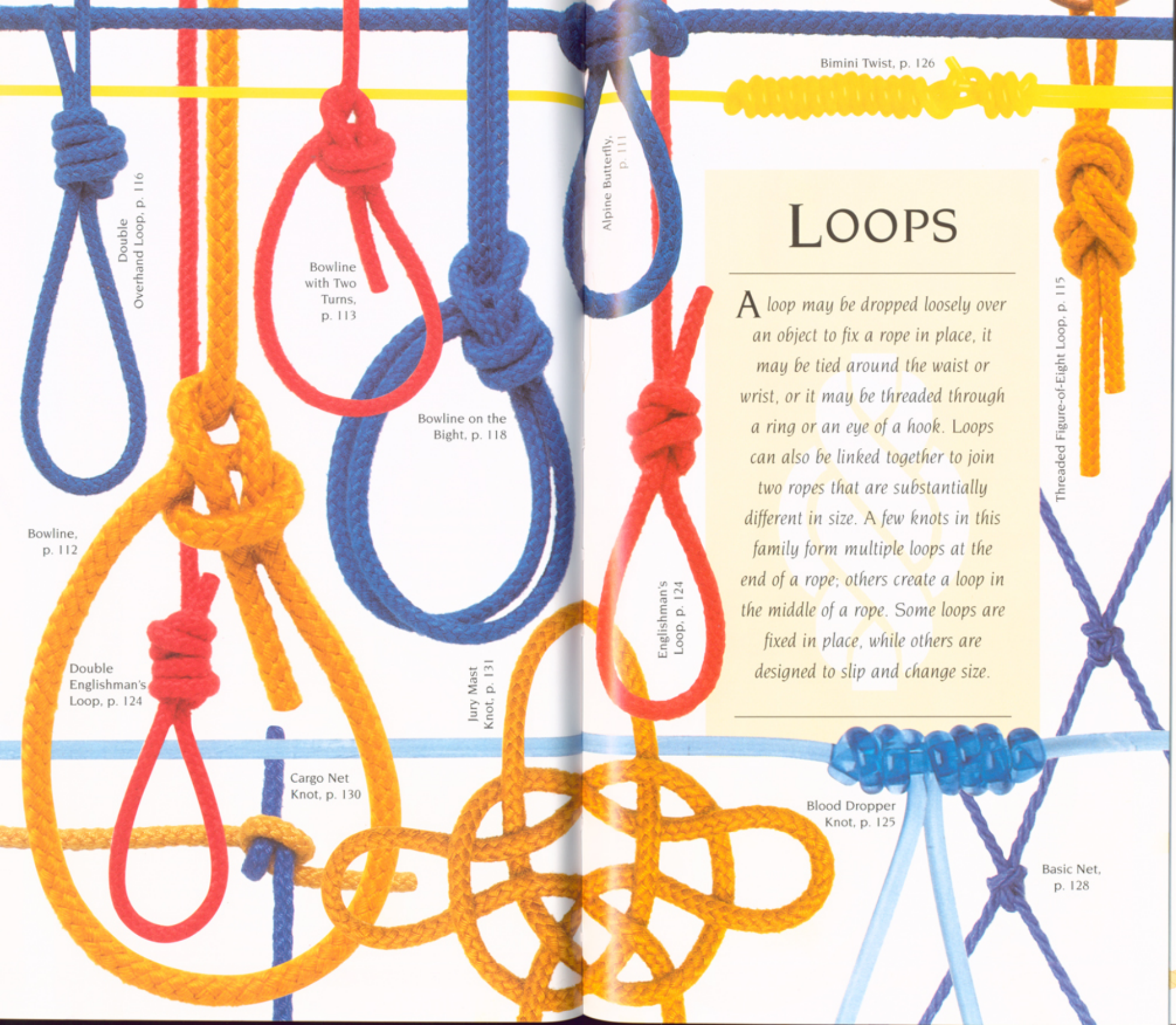
❷ Fold the left crossing turn over to lie on top of the right crossing turn.

❸ Slide the left then the right crossing turn onto a *screwgate karabiner*.

❹ To cause the knot to slip, apply strain to the left (*loaded*) rope. Control the amount and speed of slip by pulling on the right (*braking*) rope.

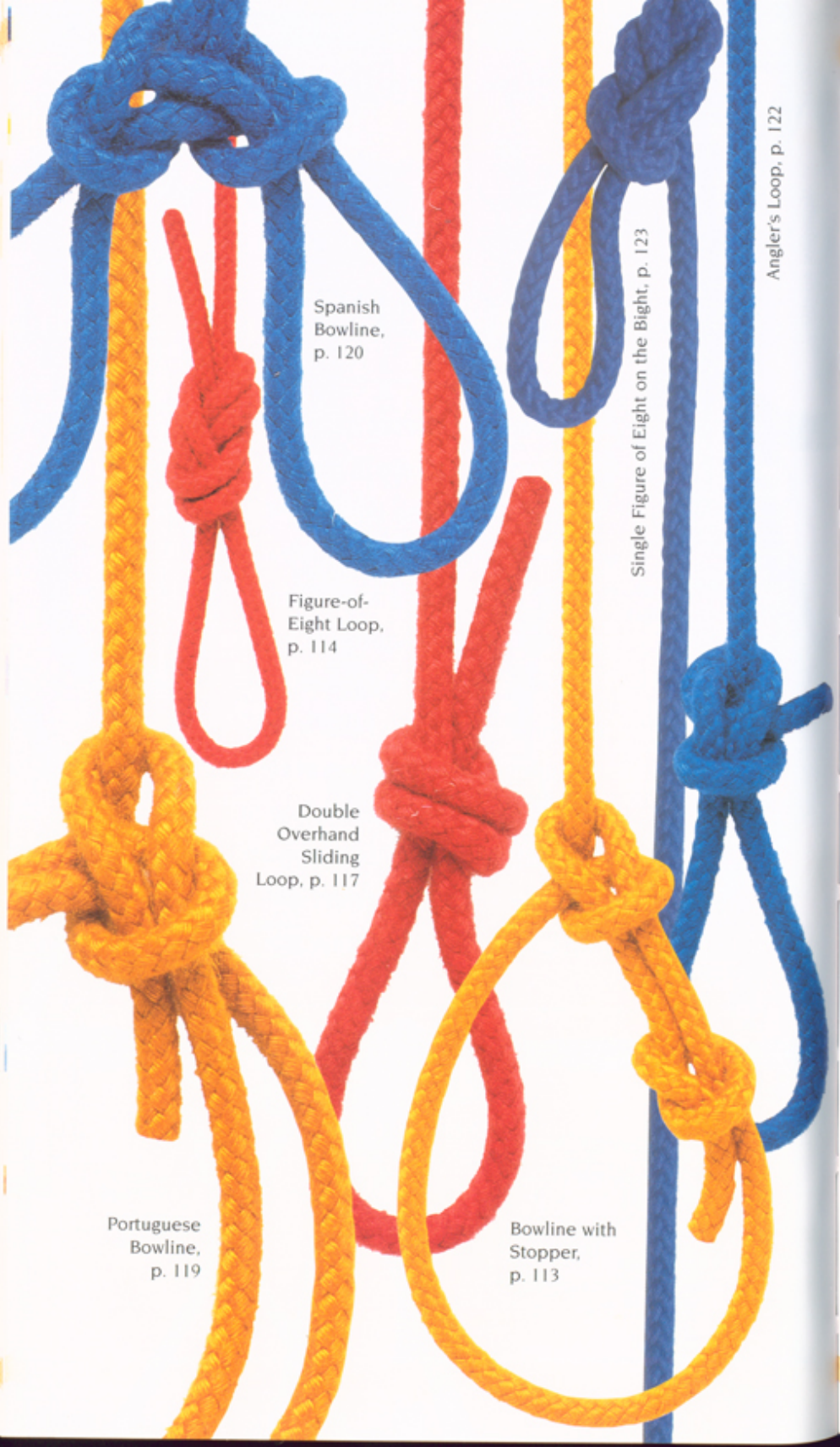
REVERSED ITALIAN HITCH

Reverse the Italian Hitch by taking strain off the *loaded* rope and applying it to the *braking rope*. The former braking rope becomes the loaded rope, and the former loaded rope becomes the braking rope.



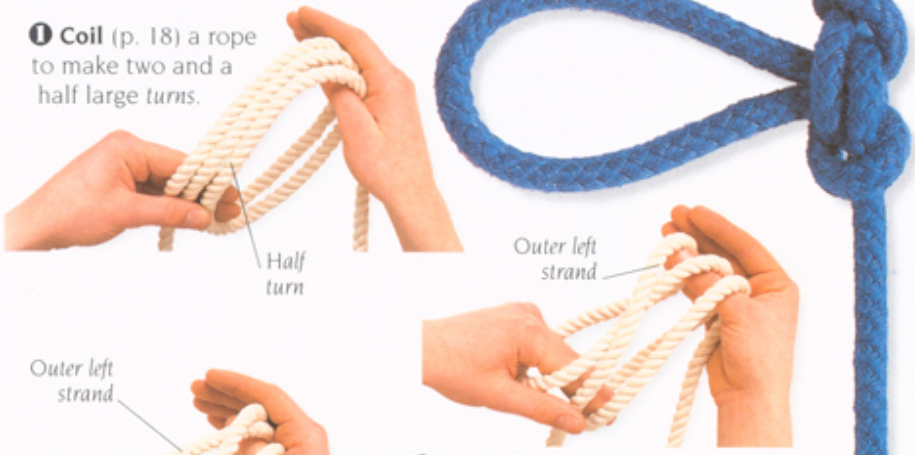
Loops

A loop may be dropped loosely over an object to fix a rope in place, it may be tied around the waist or wrist, or it may be threaded through a ring or an eye of a hook. Loops can also be linked together to join two ropes that are substantially different in size. A few knots in this family form multiple loops at the end of a rope; others create a loop in the middle of a rope. Some loops are fixed in place, while others are designed to slip and change size.

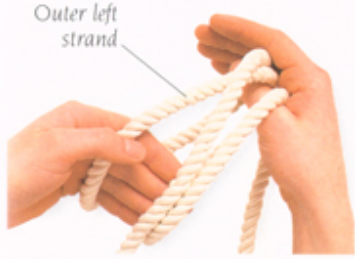


Alpine Butterfly

The Alpine Butterfly can be tied quickly in the middle of a rope. It is a useful knot for securing one climber between two others, since strain can be applied on either side of the knot.



1 Coil (p. 18) a rope to make two and a half large *turns*.

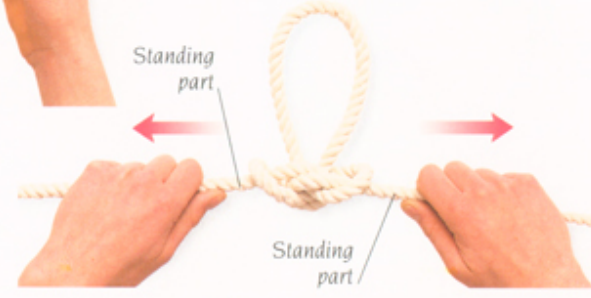


2 Bring the bottom of the outer left strand across and into the centre of the remaining two strands.

3 Pick up the strand that is now on the outer left side of the coil.

4 Pass this outer left strand over the other two strands, then through the centre of the coil.

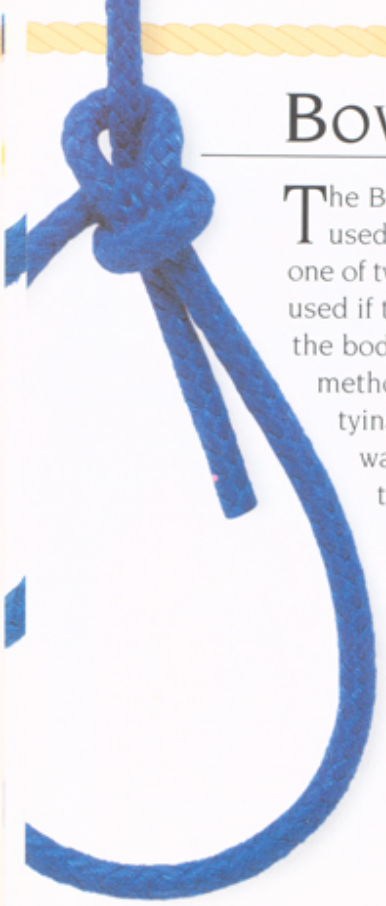
5 Pull the strand through to form a *loop*. Push the remaining strands towards the loop, and work the knot into shape (p. 24).

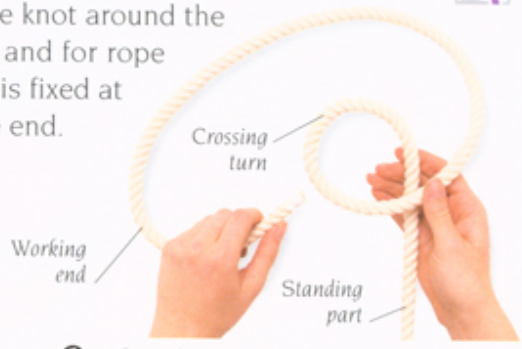


6 Pull on both *standing parts* to tighten the knot.

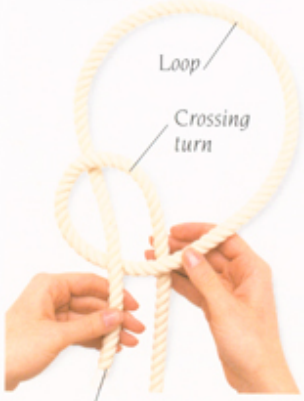
BOWLINE

The Bowline is a general-purpose, widely used loop that can be tied quickly using one of two methods. The first method (below) is used if the *standing part* is free to lead towards the body as the knot is tied. The second method (opposite) is useful for tying the knot around the waist, and for rope that is fixed at one end.

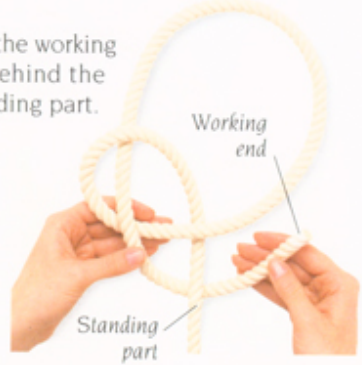




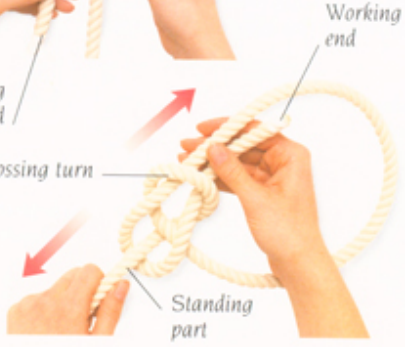
❶ Take a long *working end* of a rope over the *standing part* to form a *crossing turn*. Hold the crossing turn in place with one hand.



❷ Pass the working end through the crossing turn from back to front. Leave a large *loop* in the working end to form the final loop of the knot.



❸ Take the working end behind the standing part.



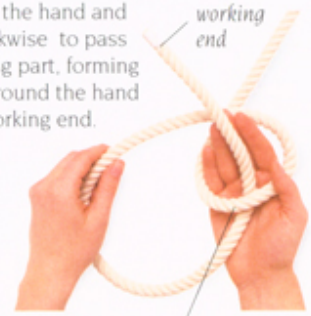
❹ Pass the working end up through the crossing turn from front to back. Pull on the standing part and on the doubled working end to tighten the knot.

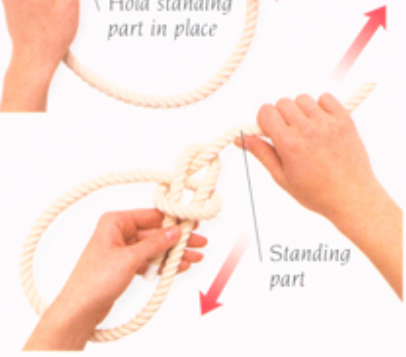
BOWLINE – SECOND METHOD

Before tying a Bowline with this method, make sure that the *standing part* leads away from the body. This method can also be used to secure a loose end of a rope to a fixed length, using the fixed length as the standing part.

❶ Hold the *working end* in the palm of the hand, and place it over the *standing part*. Use the hand to push the working end under the standing part so that the pal faces upwards, with the fingers pointing towards you.

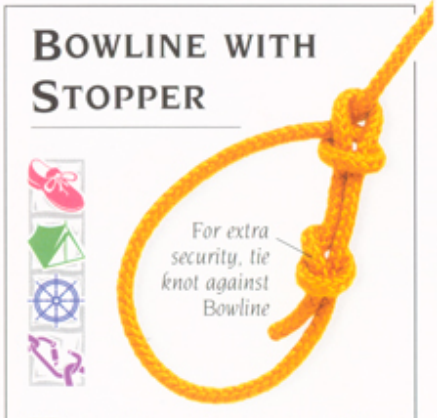
❷ Rotate the hand and working end clockwise to pass over the standing part, forming a *crossing turn* around the hand and the working end.





❸ Take the working end behind the standing part. Insert it down through the crossing turn from front to back. Pull on the standing part and on the doubled working end to tighten the knot.

BOWLINE WITH STOPPER



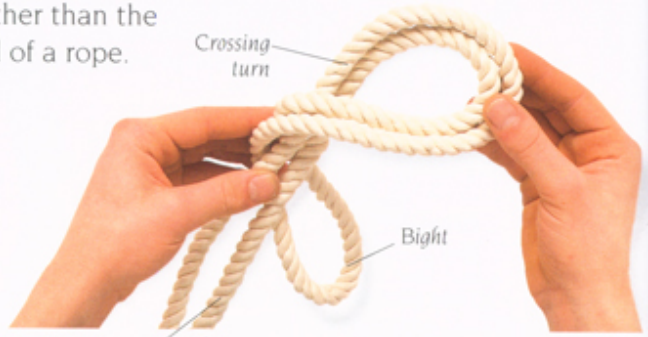
The addition of an Overhand Knot (p.28) to the Bowline (opposite), tied with *working end* taken around the *loop* and tucked under itself, gives a more secure version of the Bowline.

BOWLINE WITH TWO TURNS

A Bowline with Two Turns will prevent a slippery *line* or rope from working loose. Tie a Bowline (opposite), making a second *crossing turn* on top of the first at Step 1.

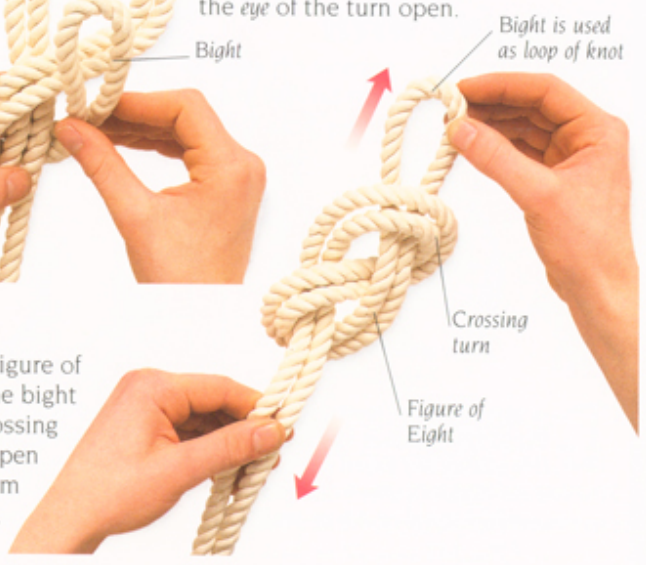
FIGURE-OF-EIGHT LOOP

Also known as the Double Figure of Eight, this loop is favoured by climbers because its distinctive shape makes it easy to check. While it is not as easy to untie as the Bowline (p. 112), it is less likely to be tied incorrectly. The Figure-of-Eight Loop is formed in the same way as the Figure of Eight (p. 30), using a *bight* rather than the end of a rope.



❶ **Form** a *bight* by doubling a length of rope. Make a *crossing turn* by taking the bight over and behind the *standing parts*.

❷ **Bring** the bight to the front of the knot, keeping the *eye* of the turn open.

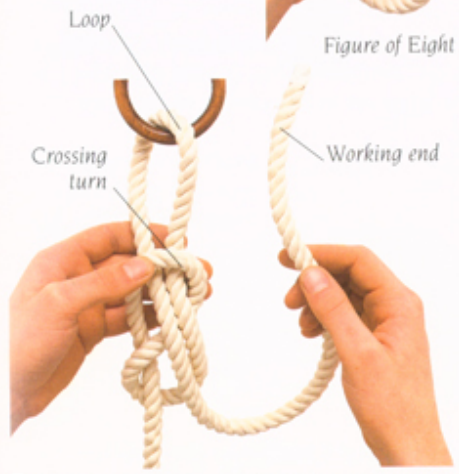


❸ **To** form the Figure of Eight, pull the bight through the crossing turn. Pull tight. Open out the bight to form the *loop* of the knot.

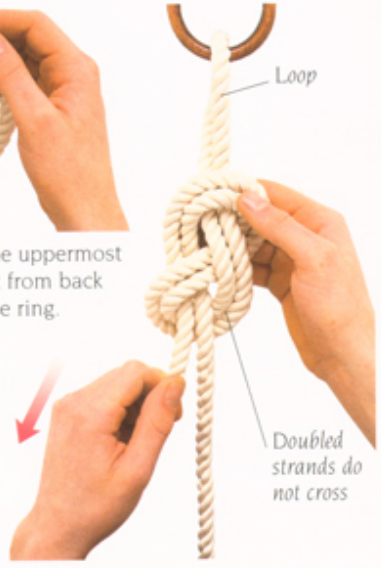
THREADED FIGURE-OF-EIGHT LOOP

This knot is threaded through tie-on loops on a climber's harness. It can also be tied around a ring or pole. Double (p. 25) the rope neatly so that the knot lies snug and even.

❶ **Leaving** a long *working end*, tie a loose Figure of Eight (p. 30) with a single strand of rope. Thread the working end through a ring.



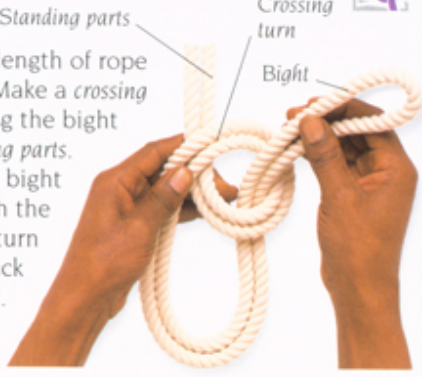
❷ **Insert** the working end into the uppermost *crossing turn* of the Figure of Eight from back to front, forming a *loop* around the ring.



❸ **Double** the Figure of Eight by following the path of the knot with the working end. Pull tight. Work the knot into shape (p. 24), easing the strands into place so that they do not cross.

BOWLINE ON THE BIGHT

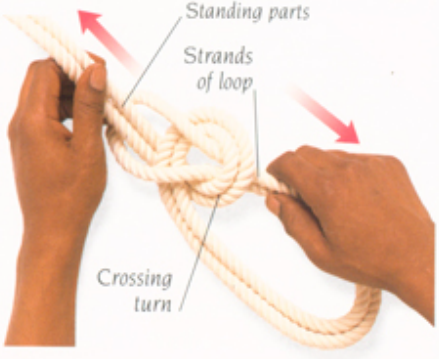
This double loop can be tied in the middle of a length of rope. The two strands of the loop can then be used separately. If only one strand of the rope is used to take strain, tie the loose strand to the first strand using an Overhand Knot (p. 28).



❶ **Double** a length of rope to form a *bight*. Make a *crossing turn* by taking the bight over the *standing parts*. Pass the bight through the crossing turn from back to front.

❷ **Leaving** a double-stranded *loop*, open out the bight, and pull it down to extend just below the loop.

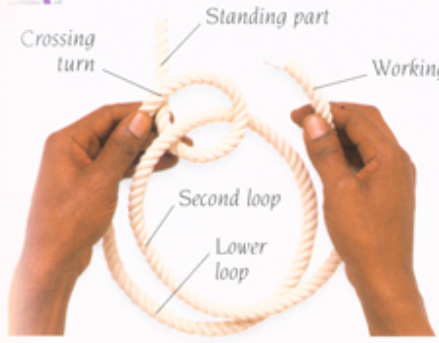
❸ **Pass** the bight over, then behind the loop and crossing turn. Bring it up behind the standing parts.



❹ **To** tighten the knot, pull on the standing parts and on the strands of the loop below the crossing turn.

PORTUGUESE BOWLINE

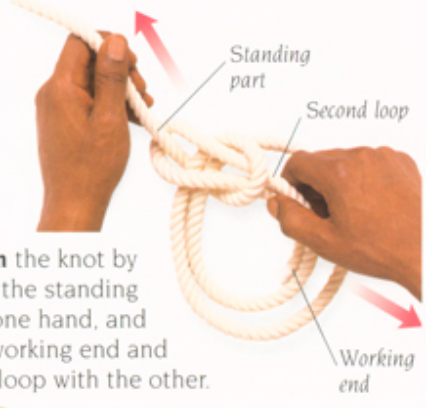
By adding an additional *loop* to the Bowline (p. 112), a pair of loops can be made that are adjustable in proportion to each other. Equal strain needs to be taken on both loops to prevent them from changing size while they are being used.



❶ **Leaving** a long *working end*, take the rope over the *standing part* to make a *crossing turn*. Bring the working end up through the crossing turn from back to front, forming a lower *loop*. Bring the working end back up to form a second loop.

❷ **Pass** the working end up through the crossing turn from back to front a second time, then take it behind the standing part.

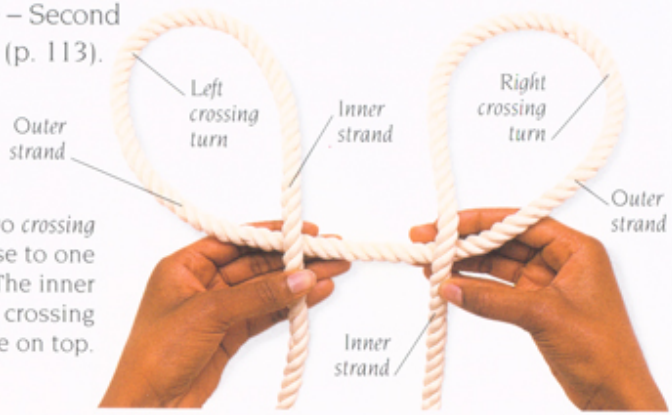
❸ **Take** the working end down through the crossing turn.



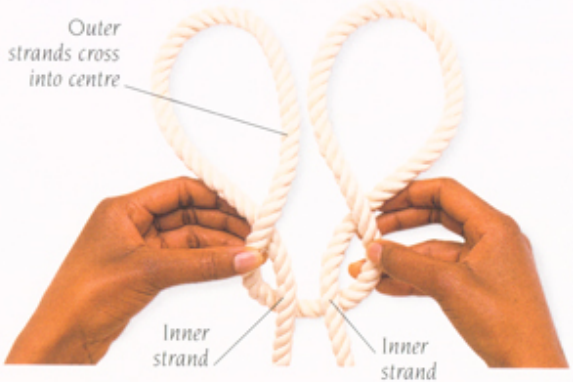
❹ **Tighten** the knot by pulling on the standing part with one hand, and on the working end and the second loop with the other.

SPANISH BOWLINE

A variation of the Bowline (p. 112), the Spanish Bowline has two *loops* that can be adjusted and will lock into position. Strain should be taken equally on both loops. If only one standing part of the rope will be used, tie the spare standing part to the first, following Steps 1–3 of the Bowline – Second Method (p. 113).

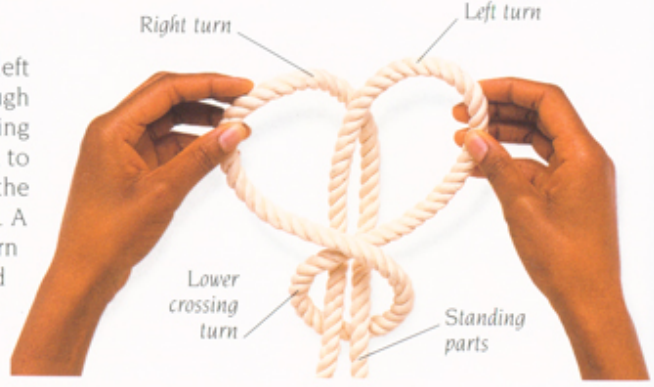


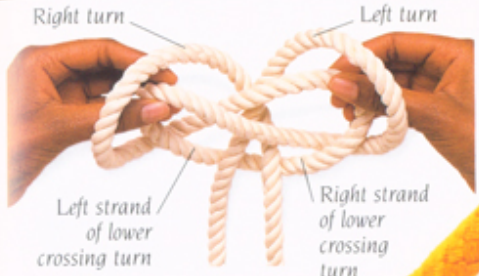
❶ Make two *crossing turns* close to one another. The inner strands of the crossing turns should lie on top.



❷ Pick up both crossing turns, and twist the outer strands over the inner strands so that they cross just below the centres of each turn.

❸ Pass the left crossing turn through the right crossing turn from back to front, keeping the knot symmetrical. A lower crossing turn will form around the *standing parts* at the bottom of the knot.

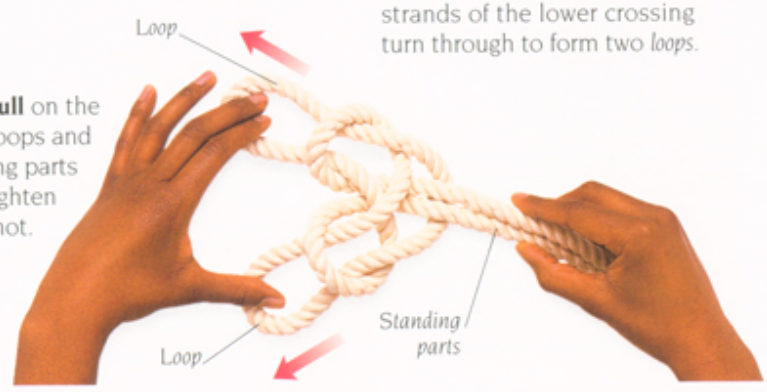




❹ Reach through the back of each turn. Pick up the right strand of the lower crossing turn with the right hand and the left strand of the lower crossing turn with the left hand.

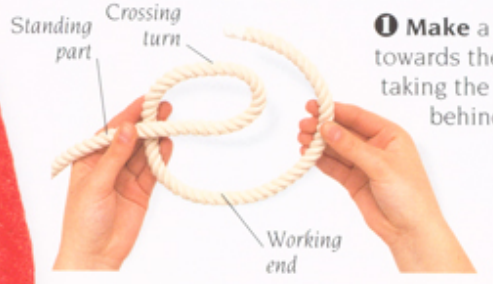
❺ Pull the right and left strands of the lower crossing turn through to form two *loops*.

❻ Pull on the loops and standing parts to tighten the knot.

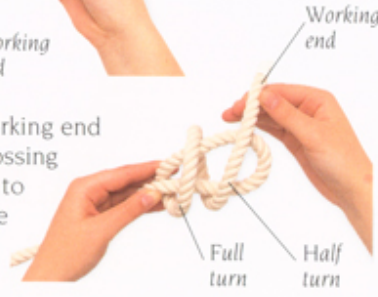


ANGLER'S LOOP

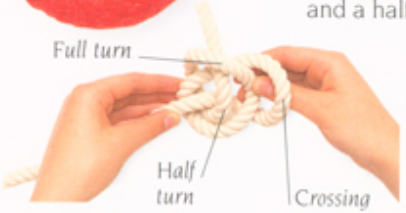
Often tied in fishing *line*, the Angler's Loop is suitable for all types of *thin line* as well as rope. It is not suitable for use in *large-diameter rope*, since it can be difficult to untie. This is the best knot to use for a permanent *loop* in *shock cord*, when it should be pulled as tight as possible before use.



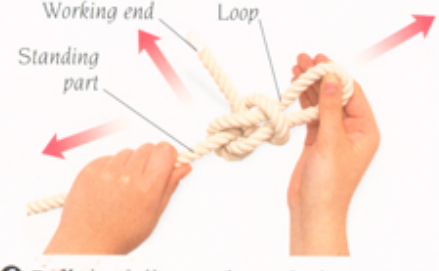
❶ **Make** a *crossing turn* towards the end of a rope, taking the *working end* behind the *standing part*.



❷ **Wrap** the working end around the crossing turn from front to back to make one and a half *turns*.



❸ **Insert** the forefinger and thumb through the back of the crossing turn, and bring the full turn over the half turn.



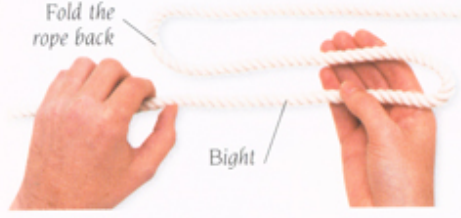
❹ **Pull** the full turn through the crossing turn to form the *loop* of the knot. Tighten the knot by pulling on the loop, the standing part, and the working end.

USING SHOCK CORD

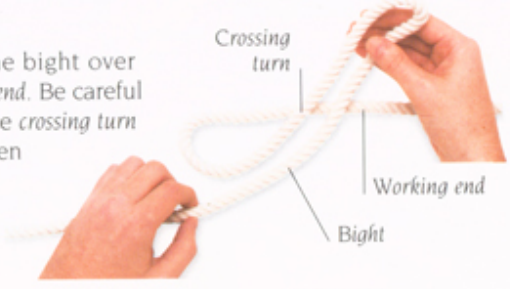
If *shock cord*, which has a lot of stretch, is used to tie the Angler's Loop, tighten the knot a little at a time, otherwise it is likely to collapse. Shock cord should be used to tie this knot only if the loop is intended to be permanent, since it is very difficult to untie.

SINGLE FIGURE-OF-EIGHT ON THE BIGHT

This *loop* knot, sometimes known as a Single Bowline on the Bight, is ideal when a loop is needed on a *bight* to take a pull in one direction only. For ease of untying, make sure that the knot is worked neatly into the figure-of-eight form.

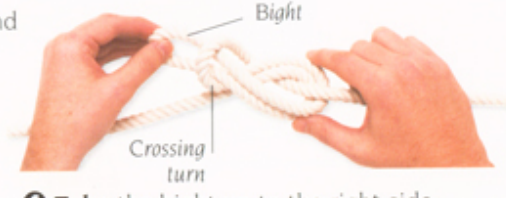


❶ **Form** a *bight* in the rope and fold back parallel to the rope.

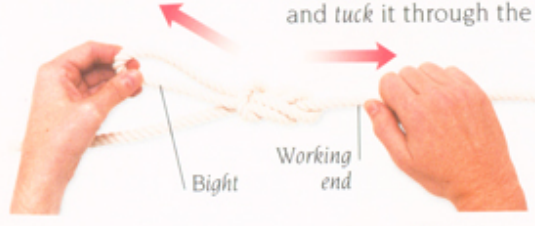


❷ **Bring** the bight over the *working end*. Be careful to retain the *crossing turn* that has been formed.

❸ **Tuck** the bight behind the working end of the rope while holding the crossing turn with one hand.



❹ **Take** the bight up to the right side and *tuck* it through the crossing turn.

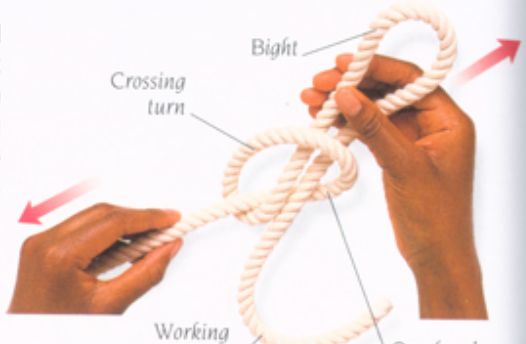


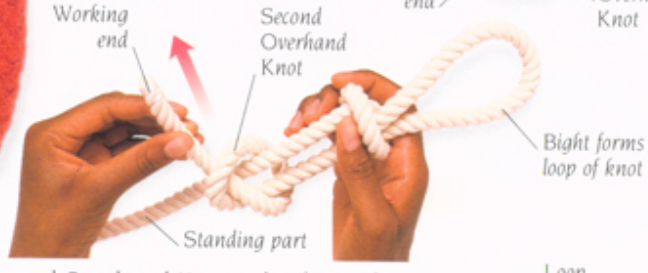
❺ **Pull** the working end and the bight in opposite directions to complete the knot.

ENGLISHMAN'S LOOP

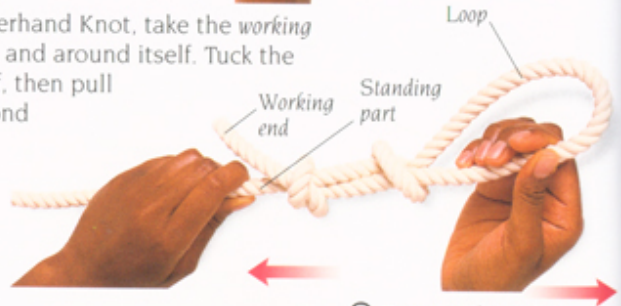
Similar to the Fisherman's Knot (p. 74), the Englishman's Loop uses two Overhand Knots (p. 28) to form a fixed *loop*. The drawing together of two knots to form one gives this knot a symbolic romantic value.

❶ Tie a Slipped Overhand Knot (p. 28), passing a *bight* through a *crossing turn*. This forms the first Overhand Knot.





❷ To tie the second Overhand Knot, take the *working end* over the *standing part* and around itself. Tuck the working end under itself, then pull on it to tighten the second Overhand Knot.



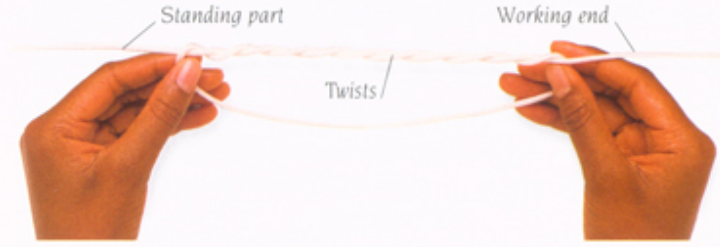
❸ To complete the Englishman's Loop, pull on the standing part and on the *loop* so that the two Overhand Knots slide together.

DOUBLE ENGLISHMAN'S LOOP

For extra security when using slippery rope, double (p. 25) each Overhand Knot as it is made while tying the Englishman's Loop (above).

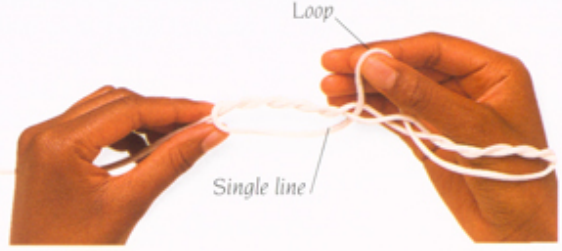
BLOOD DROPPER KNOT

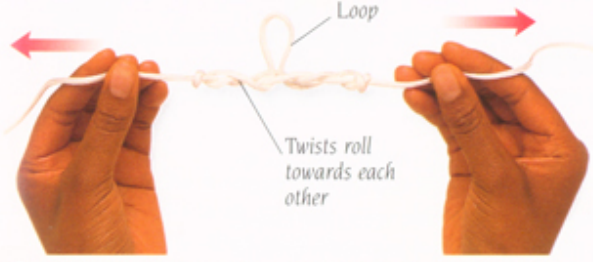
This knot is tied at the end of fishing *line* to form a *loop* to which a short length of line with a fly or a baited hook can be fixed. The twists in this knot identify it as a member of the *blood knot* family.



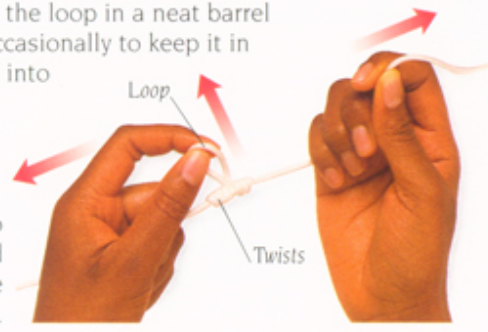
❶ Tie a large, loose Overhand Knot (p. 28), taking the *working end* over and under the *standing part*. Tuck the working end five times around the standing part, forming ten twists.

❷ Find the centre of the single line in the Overhand Knot, and pass it up through the centre twist to form a *loop*.





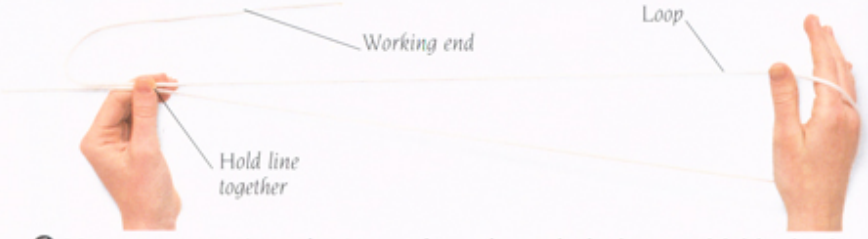
❸ Pull on the line either side of the twists so that they roll together towards the loop in a neat barrel shape. Pull on the loop occasionally to keep it in place, and work the twists into shape (p. 24) if necessary.



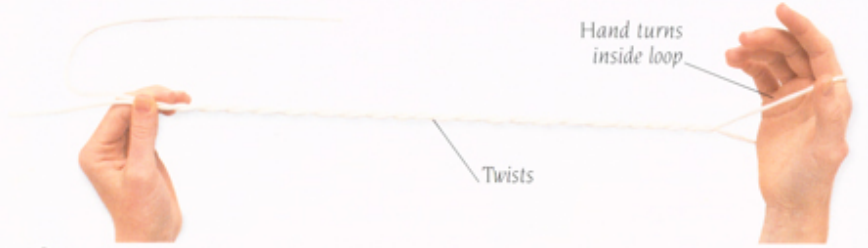
❹ Give a final tug to both ends of the line and to the loop to bed the twists securely in place.

BIMINI TWIST

The Bimini Twist is used to form a long *loop* at the end of a braided or monofilament fishing *line*. Originally developed for big-game fishing, it now has a place in all styles of fishing. The technique used to tie this knot needs two pairs of hands, and may take some practice.

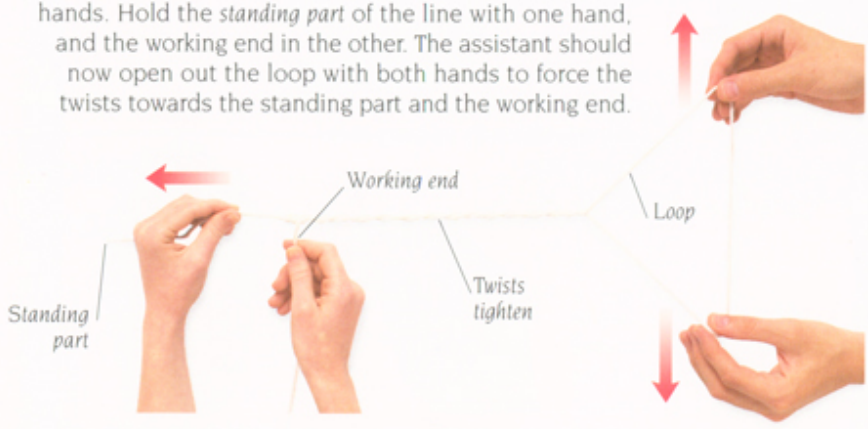


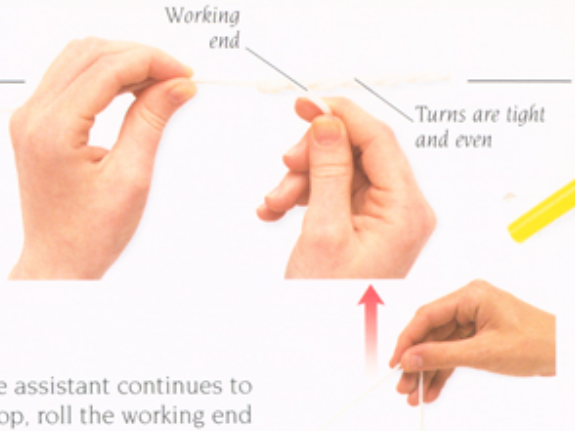
❶ Measure approximately 1½ m (5 ft) at the end of a line, and fold it back to form a *loop*. Hold the line together with one hand, leaving a *working end* of about 45 cm (18 in). Open out the end of the loop with the other hand.



❷ Keeping the line under tension, twist the hand inside and around the end of the loop, forming twists in the two lines of the loop. Continue until approximately 20 twists have been made in the lines.

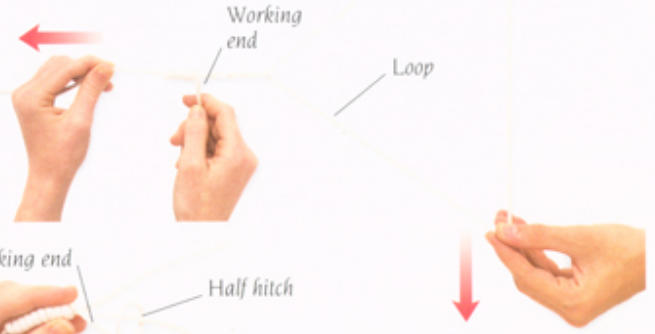
❸ Still maintaining the tension in the line, ask an assistant to take the remainder of the loop in both hands. Hold the *standing part* of the line with one hand, and the working end in the other. The assistant should now open out the loop with both hands to force the twists towards the standing part and the working end.

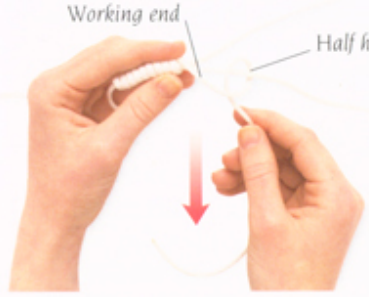




❹ Allow the working end to roll around the outside of the twists as they tighten. Keep these *turns* even.

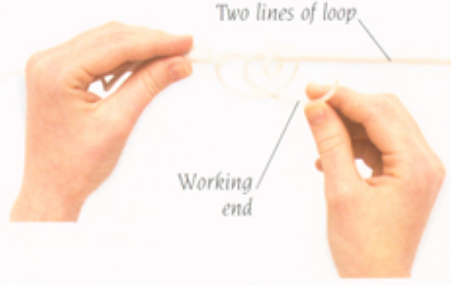
❺ While the assistant continues to open out the loop, roll the working end around the line towards the loop.

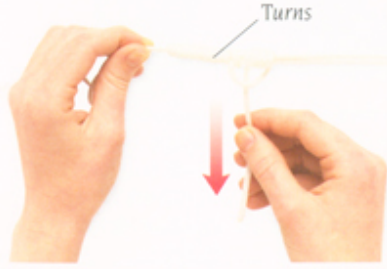




❻ When the working end has covered all the twists, pass it around one of the lines of the loop and under itself to form a *half hitch*. Pull tight.

❼ Take the working end around both lines of the loop, then pass it twice under itself.



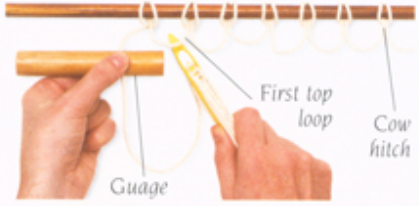


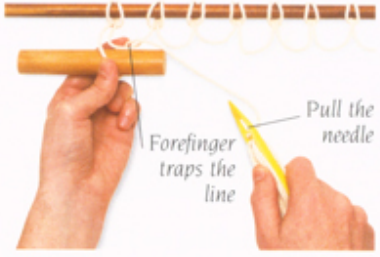
❽ Pull the working end tight. Work the turns neatly into place (p. 24), and trim (p. 25) the working end to approximately 6 mm (¼ in).

BASIC NET

A net is a series of holes with a line knotted round them. The line to make these knots is carried on a *netting needle*. A wooden dowel may be used as a gauge to ensure that the meshes of the net are of a similar size. The oldest knot was found in a piece of netting 9000 years old on the Karelian Isthmus – that knot was the Sheet Bend (p. 68) used here.

❶ Make a row of *loops* along a bar with Cow Hitches (p. 86) or Clove Hitches (p. 56). Working from left to right, bring the needle down, over, and behind the gauge, and up through the first top loop.

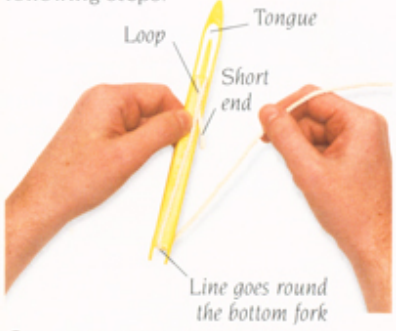




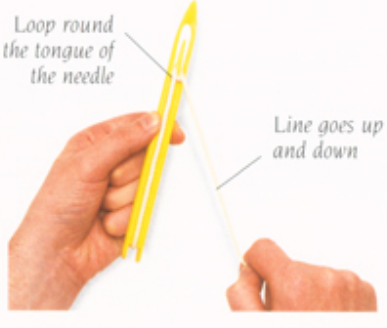
❷ Pull the needle to bring the gauge tight to the top loop. With your left forefinger, trap the line on the gauge as it comes up through the top loop.

LOADING A NEEDLE

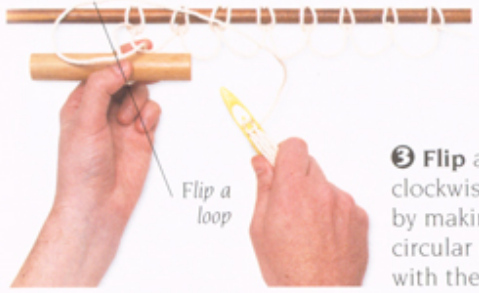
To carry the large quantity of line required to make a Basic Net, use a *netting needle* made either of wood, plastic or metal. Load the needle by using the following steps.



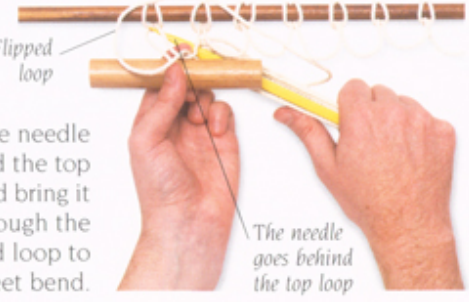
❶ Make a small *loop* in the end of the line and pass over the needle's tongue. Trapping the short end under the *working end*, take the line down the front, and round the bottom fork.



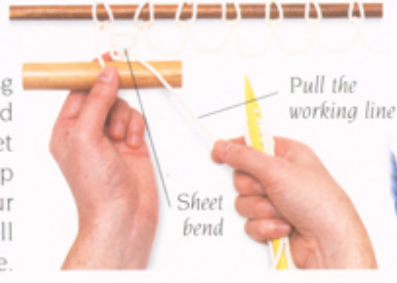
❷ Turn the needle over and bring the line up the back of the needle. Put a loop around the tongue and take the line back to the bottom fork. Keep going to the front and back alternately.



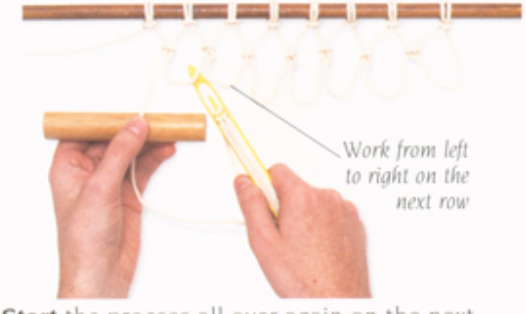
❸ Flip a loop in a clockwise direction by making a quick circular movement with the needle.



❹ Take the needle behind the top loop, and bring it out through the flipped loop to make a sheet bend.



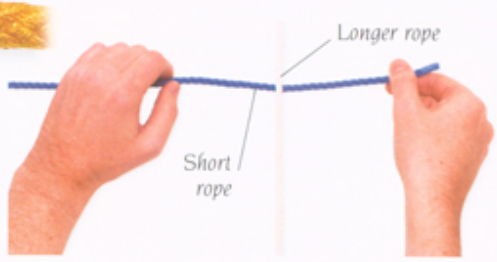
❺ Pull the working line tight. This should tighten the sheet bend, which will slip from under your forefinger and sit well on top of the gauge.



❻ Start the process all over again on the next top loop. Complete Steps 1–6. A series of knots will create the first row of netting. Turn everything over and start the next row, again working from left to right.

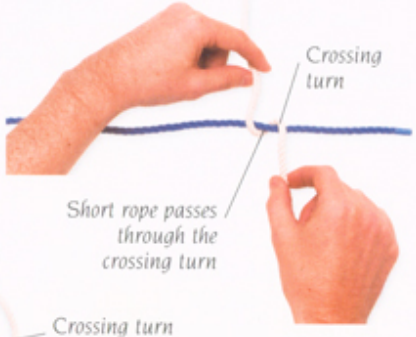
Cargo Net Knot

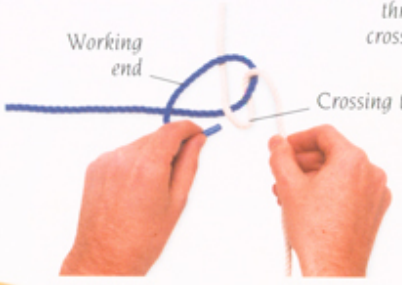
Heavy rope used to make cargo nets cannot be netted in the basic sheet bend method. Use the following knot for such ropes. Arrange the ropes at a 90-degree angle to one another, and use the short horizontal rope to make the tuck.



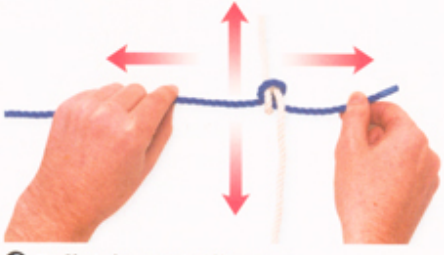
❶ **Place** the short working rope under the longer rope.

❷ **Hold** the long rope above and below the short rope, and make a *crossing turn*. Pass the short rope through the crossing turn.





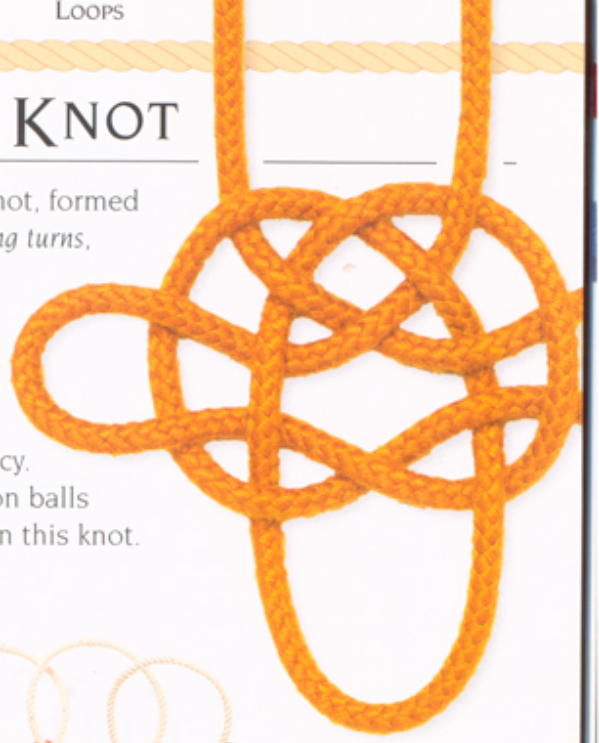
❸ **Bring** the *working end* of the short rope over the crossing turn. Then pass it through the crossing turn again.



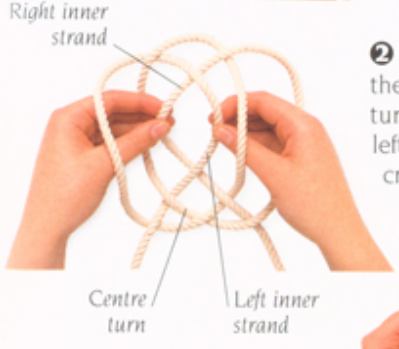
❹ **Pull** tight vertically, then horizontally to work the knot into shape (p. 24).

Jury Mast Knot

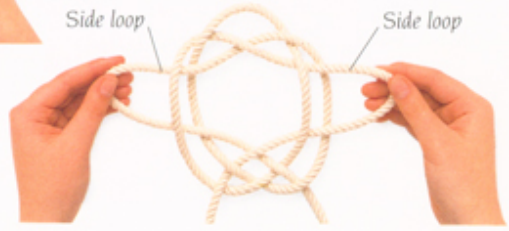
This decorative knot, formed from three *crossing turns*, can be used to provide the multiple *loops* needed to secure the *rigging* of a boat in an emergency. It is said that cannon balls used to be carried in this knot.



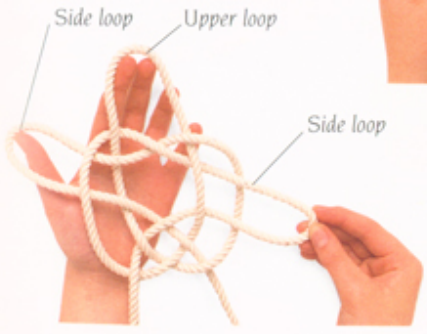
❶ **Pass** a rope behind itself to form three large, loose *crossing turns*, each one overlapping the previous turn.



❷ **Insert** the right hand through the front of the right crossing turn and under the centre turn. Take hold of the inner strand of the left turn. Insert the left hand under the left crossing turn and over the centre turn. Take hold of the inner strand of the right turn.



❸ **Pull** the inner strands through the outer crossing turns to form two *loops* at the sides of the knot.



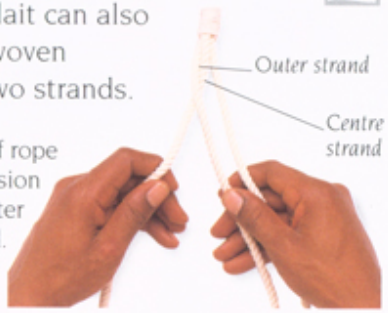
❹ **Pull** on the side loops, and pull on the top of the centre turn to form an upper loop. Adjust the three loops to form a symmetrical knot.

PLAITS & SENNITS

A plait is made up of a number of strands of rope interwoven in a simple, repetitive pattern. Strands woven in complex patterns are known as sennits. Most plaits and sennits will create a stronger length of rope that is compact and flexible; some will create a flat knot. Plaits and sennits must be woven with an even tension to produce knots that are neat and decorative.

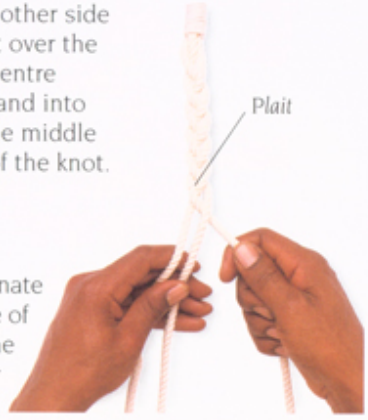
THREE-STRAND PLAIT

This is the simplest form of plait. Often used to dress hair, it shows the basic principle of plaiting, in which alternate outer strands are brought into the centre of a knot. This plait can also be made with six strands, woven together in three pairs of two strands.



❶ **Bind** three strands of rope together at one end. Keeping tension on all strands, take one outer strand over the centre strand.

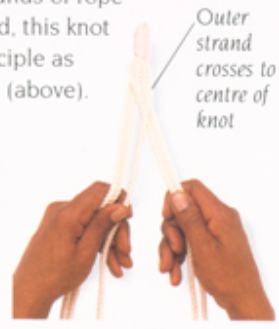
❷ **Take** the outer strand on the other side of the plait over the new centre strand into the middle of the knot.



❸ **Continue** taking alternate outer strands into the middle of the knot. *Seize* (p. 25) the three strand ends together when the plait is complete.

FIVE-STRAND SENNIT

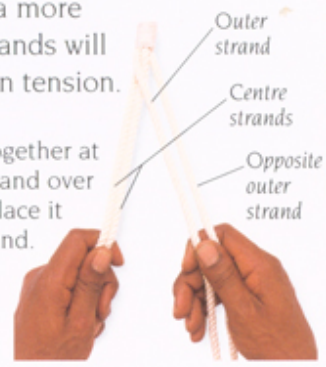
Made with five strands of rope bound at one end, this knot follows the same principle as the Three-Strand Plait (above).



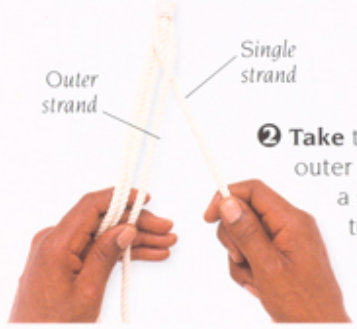
❶ **Holding** the strands in both hands to maintain an even tension, take alternate outer strands over two strands into the middle of the knot. *Seize* (p. 25) the strands together when the sennit is complete.

FOUR-STRAND SENNIT

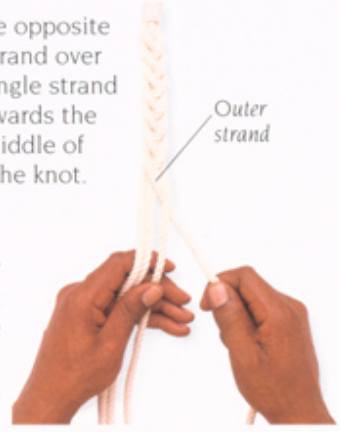
Following a similar pattern to the Three-Strand Plait (opposite), four or more strands may be woven together to form a more decorative sennit. The strands will need to be kept at an even tension.



❶ **With** four strands bound together at one end, take one outer strand over the two centre strands to place it beside the opposite outer strand.



❷ **Take** the opposite outer strand over a single strand towards the middle of the knot.



❸ **Continue** taking the outer strand on one side of the plait over two strands, and the opposite outer strand over one strand. When the sennit is complete, *seize* (p. 25) the strands together.

SIX-STRAND SENNIT

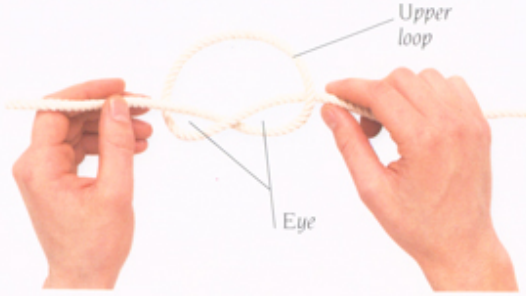
An almost symmetrical sennit, this knot needs to be kept flat and held under tension while being tied.

❶ **Starting** with six strands bound at one end and laid side by side, take alternate outer strands over three strands on one side of the knot and over two strands on the opposite side of the knot. *Seize* (p. 25) the strands together.

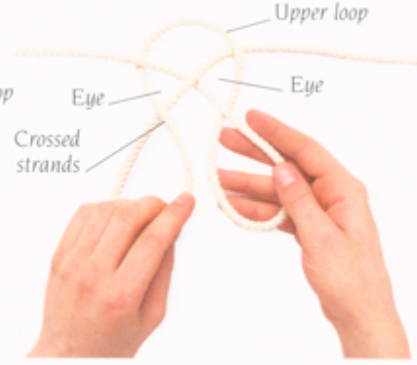
Ocean-Plait Mat

This flat, decorative knot is based on a simple Overhand Knot (p. 28). Since a lot of rope is needed to complete the mat, it is essential to begin by generously estimating (p. 22) the amount of rope required. Large mats may need to be quadrupled, depending on the thickness of the rope.

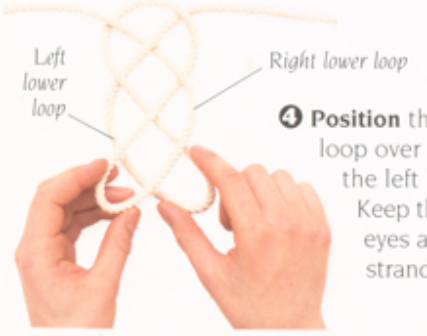
❶ Tie a loose Overhand Knot towards the right end of the rope, leaving enough rope on the short end to complete Steps 2–5. Hold the knot so that the large *loop* is at the top, with two lower, smaller *eyes* on either side of the crossed rope.



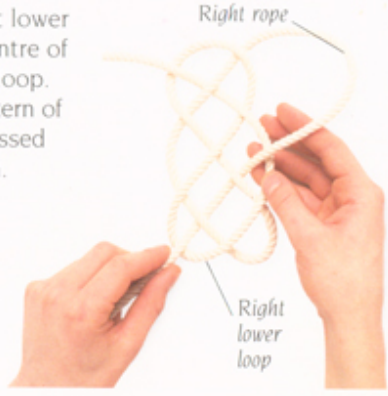
❷ Pull on the crossed strands of the Overhand Knot to form two lower loops, each one approximately three-quarters of the length of the finished mat.



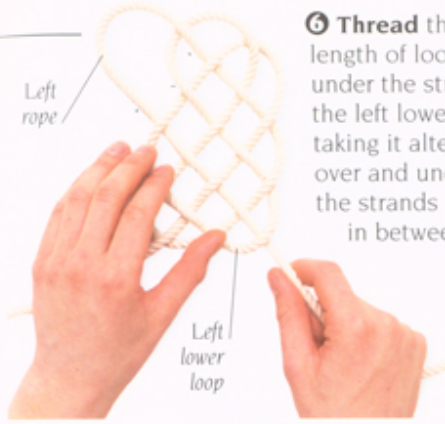
❸ Twist each lower loop over in a clockwise direction. Leave an eye approximately the same size as the upper loop above the crossed strands.



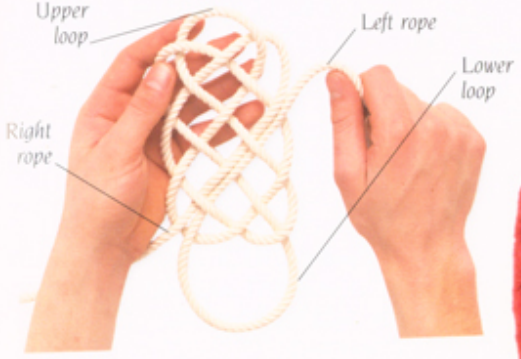
❹ Position the right lower loop over the centre of the left lower loop. Keep the pattern of eyes and crossed strands even.



❺ Take the right length of loose rope over the right lower loop, under both strands of the left lower loop, and up through the tip of the right lower loop.

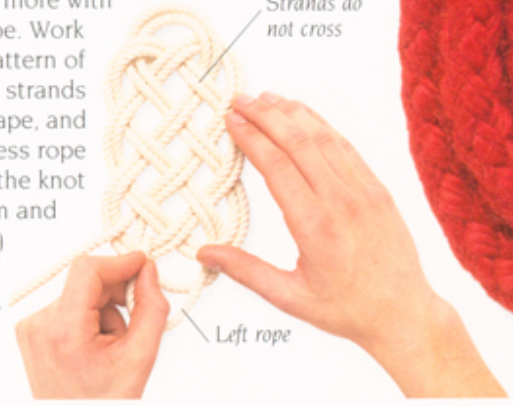


❻ Thread the left length of loose rope under the strands of the left lower loop, taking it alternately over and under the strands in between.



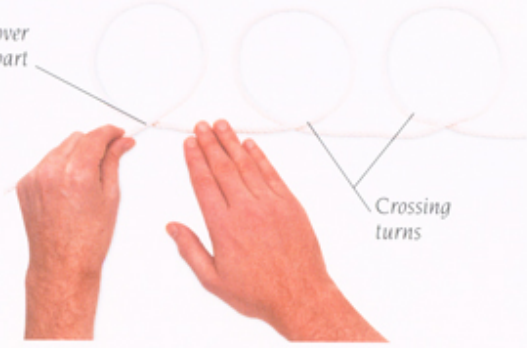
❼ Double (p. 25) the knot, threading the left rope upwards through the pattern of crossed strands, and following the path of the right rope into and around the knot. Leave a lower loop at the bottom of the knot the same size as the upper loop.

❽ To triple the knot, follow the path of the doubled strands around the knot once more with the left rope. Work the pattern of crossed strands into shape, and pull excess rope through the knot (p. 24). Trim and *seize* (p. 25) the ends of the rope.

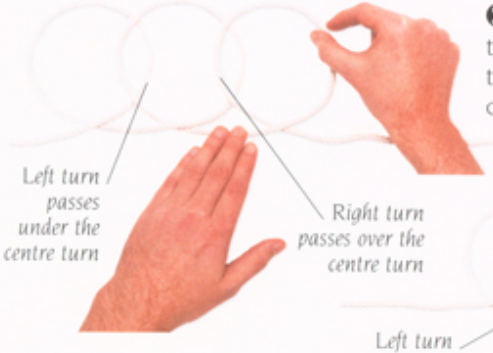


Oval Mat

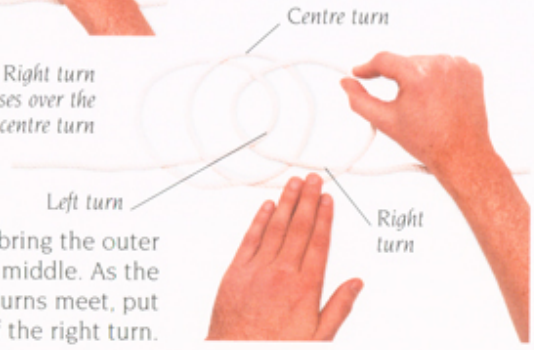
This handsome mat can be created from simple *crossing turns*. Starting in the middle of the rope, make the basic design, then even out the *loops* to obtain a good shape. Then double (p. 25) and treble the rope using both ends of the rope. Ensure that you have enough rope (p. 22) to make the mat.



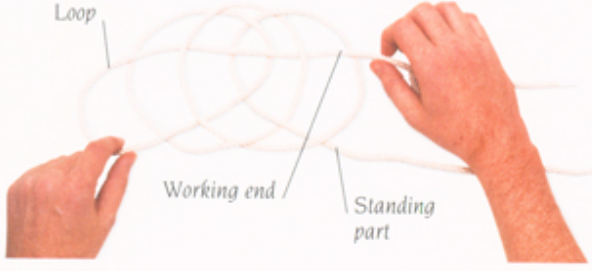
1 Make a series of three crossing turns with a clockwise twist, working from right to left. Ensure that the rope lies on top of the *standing part* as the crossing turn is made.



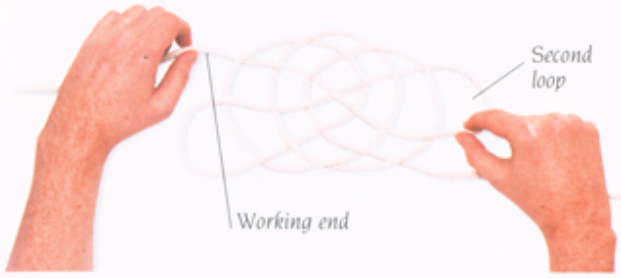
2 Push the left turn under the centre turn and take the right turn over the centre turn.



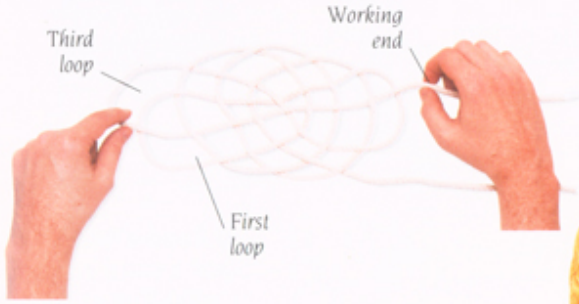
3 Continue to bring the outer turns into the middle. As the left and right turns meet, put the left on top of the right turn.



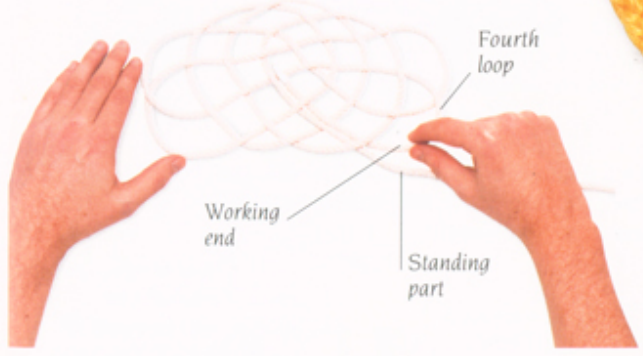
4 Form a loop with the *working end*. Take the working end across the interleaved turns, passing it over, under, over, over, under, and over.



5 Form a second loop on the right side. Bring the working end from right to left in a diagonal direction, passing the rope over, under, over, over, under, over, and under.



6 Form a third loop on the left side. Bring the working end of the rope diagonally across to the right, parallel to the first loop, passing over, under, over, under, over, under, over, under, and over.



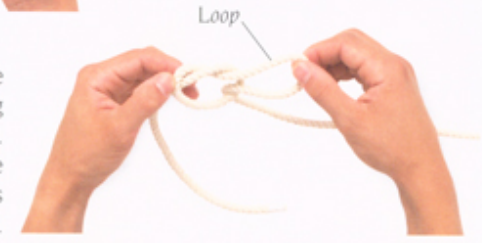
7 Form a fourth loop on the right side. Tuck the working end alongside the standing part. This completes the basic design of the mat. It can now be doubled (p. 25) or tripled by following the pattern with either end of the rope.

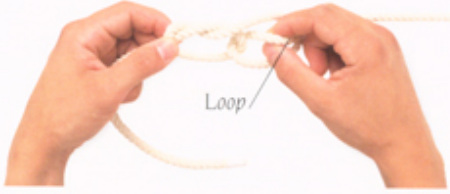
CHAIN SENNIT

The Chain Sennit is a series of interlinked *loops* that can be made in the middle of a length of rope. It needs a lot of rope, and can be used as a temporary *shortening*.

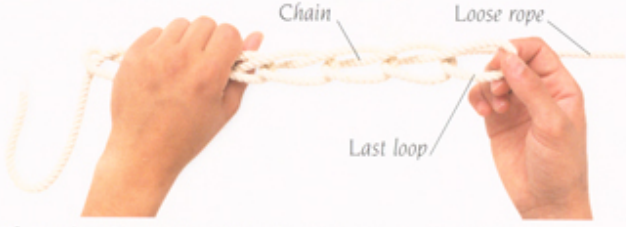
❶ **Make** a *crossing turn* by passing a rope over itself. Bring the rope behind the crossing turn.

❷ **Pull** the rope through the crossing turn to form a *loop*. Make sure that the rope remains behind the loop.

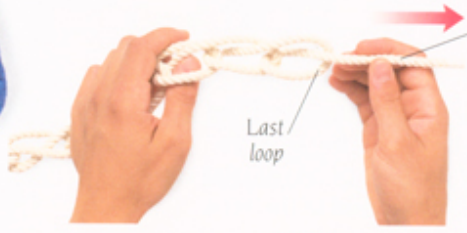




❸ **Repeat** Step 2 until a chain of interlocking loops to the required length has been formed.



❹ **When** the Chain Sennit is long enough, pull the last loop through. If the loose rope is now pulled, the Chain Sennit will undo.

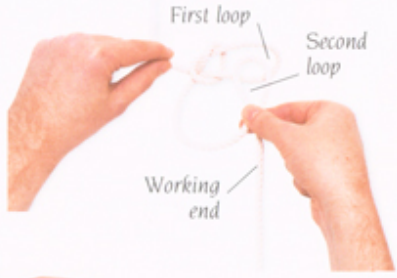


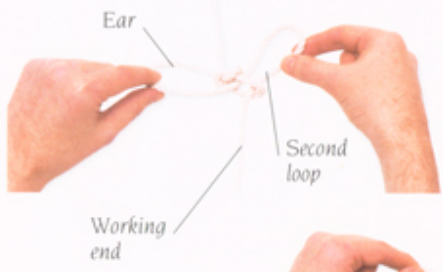
❺ **To** lock the loops of the completed Chain Sennit in place, pull the loose rope through the last loop.

SQUARE CHAIN SENNIT

A short length of Square Chain Sennit can make a fine decoration in a lanyard; a longer piece will make a good hand hold on a dog lead or a skipping rope. By starting as the Chain Sennit (opposite), but then creating a second *loop* to work with, it is possible to create this Sennit with just one strand.

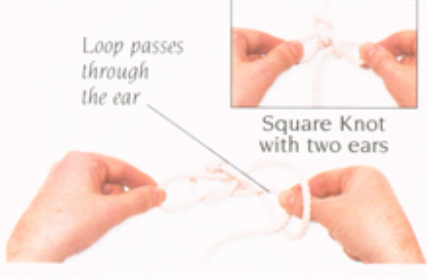
❶ **Make** a *loop* by completing Steps 1–2 of the Chain Sennit (opposite). Make a second loop with the *working end*, and put this through the first loop.





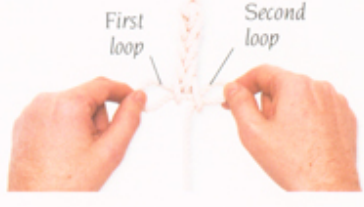
❷ **Pull** the second loop through the first loop, leaving an extra working loop or ear.

❸ **Using** the working end, *tuck* a loop through the ear.



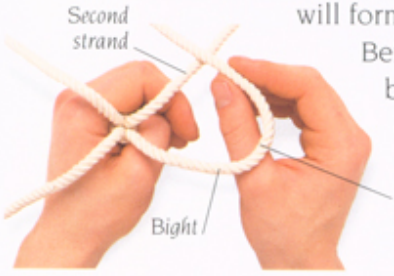
❹ **Hold** the loop formed in Step 3 with one hand, and tuck another loop through the ear. By pulling tight this loop, the knot will tighten up into a square form, leaving two ears for forming the chain (see inset).

❺ **Repeat** the tucking of a loop and the tightening of a loop using alternative ears. To lock the chain, pull the working end through the first loop and then through the second loop.

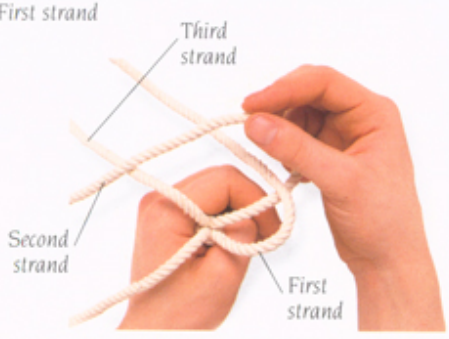


Round Crown Sennit

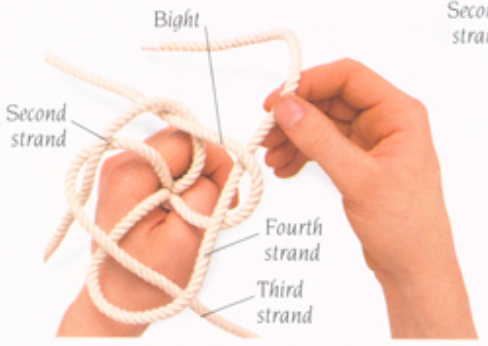
A series of Crown Knots (p. 36) made on top of one another creates this attractive sennit. Tying all the knots in the same direction will create a Round Crown Sennit (finished knot, far right); tying them in alternate directions will form a Square Crown Sennit (right). Before starting a Round Crown Sennit, bind four strands of rope together at one end with a knot or *seizing* (p. 168).



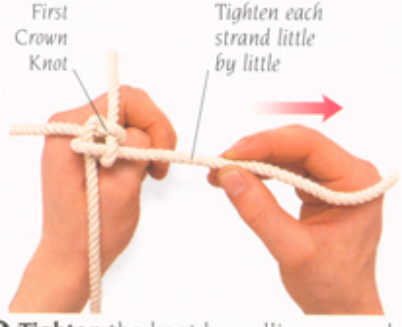
1 Pick up a first strand, and pass it in an anti-clockwise direction over the second strand. Leave a *bight* between these first two strands.



2 Working in the same direction, take the second strand, and pass it over the first and third strands.



3 Pass the third strand over the second and fourth strands. Pick up the fourth strand, and pass it over the third strand, then down through the bight formed between the first and second strands. This forms a four-strand Crown Knot.



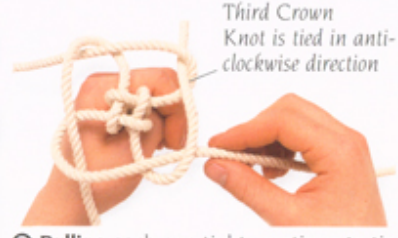
4 Tighten the knot by pulling on each strand in turn, working around the knot in two or three cycles so that the Crown Knot lies snug and even.

5 Repeat Steps 1–4 to make a series of Crown Knots in the same direction, pulling each one tight on top of the previous knot to form a Round Crown Sennit.

Square Crown Sennit

Start a Square Crown Sennit by binding together four strands of rope with a knot or *seizing* (p. 168).

1 Tie a four-strand Crown Knot, following Steps 1–4 of the Round Crown Sennit (opposite). Working in the opposite (clockwise) direction, tie a second Crown Knot on top of the first.



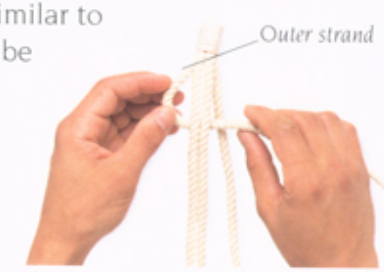
2 Pulling each one tight, continue to tie a series of Crown Knots in alternate directions to form a Square Crown Sennit.

Six-Strand Round Crown Sennit

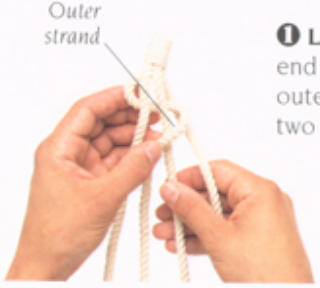
To form a cylindrical tube from a sennit, tie a series of Crown Knots with six or more strands of rope fixed at one end. Tie the knots in the same direction and in the same way as the Round Crown Sennit (opposite). Use the tube as a decorative covering for a *core*, such as another rope.

FOUR-STRAND ROUND SENNIT

Four strands of rope can be used to make a sennit that appears round. The sennit can be enhanced by using different coloured strands to create decorative patterns. If four pairs of strands are used, a *braid* similar to multiplait rope (p. 11) can be achieved. Make the sennit without interruption to maintain a neat pattern.

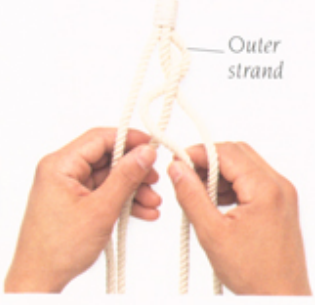


❶ Lay four strands of rope fixed at one end side by side. Pick up one of the outer strands, and take it behind the two centre strands.

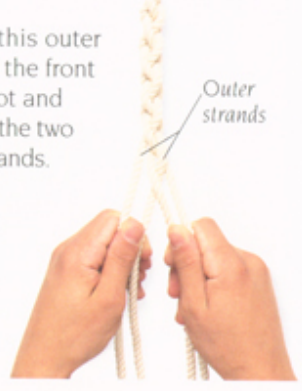


❷ Bring this outer strand to the front of the knot, and place it between the two centre strands.

❸ Pick up the outer strand on the opposite side, and take it behind the two strands in the centre of the knot.



❹ Take this outer strand to the front of the knot and between the two centre strands.

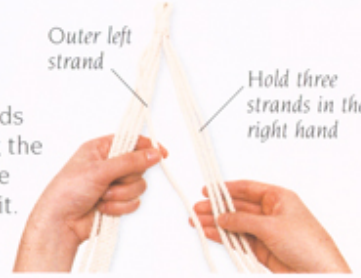


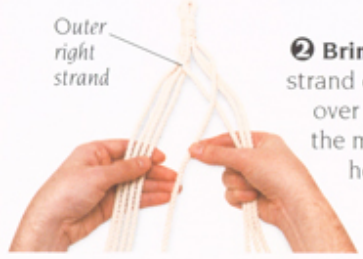
❺ Continue this pattern, taking alternate, new outer strands behind then into the middle of the strands in the centre. Keep an even tension as the knot is worked. Secure the sennit by *seizing* the ends (p. 25).

EIGHT-STRAND SQUARE SENNIT

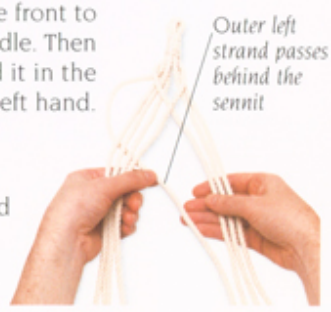
Although this sennit uses eight strands, it is created by repeating a four-step process – two steps bringing the strands to the front and two steps taking them to the back. If you stop during the making of this sennit, it is important to restart in the correct sequence. Stop with three strands in one hand and five in the other.

❶ Start with three strands flat in the right hand and five strands flat in the left hand. Then bring the outer strand on the left over the front to the middle of the sennit. Hold it in the right hand.

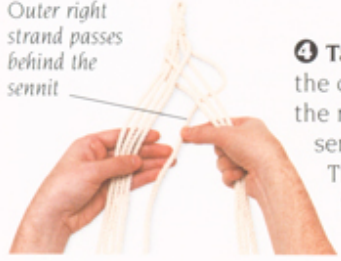




❷ Bring the outer strand on the right over the front to the middle. Then hold it in the left hand.



❸ Take what is now the outer strand on the left behind the sennit to the middle. Hold it in the right hand.



❹ Take what is now the outer strand on the right behind the sennit to the middle. Then hold it in the left hand.

❺ Repeat Steps 1–4 to form the sennit. *Seize* (p. 25) the ends of the strands.

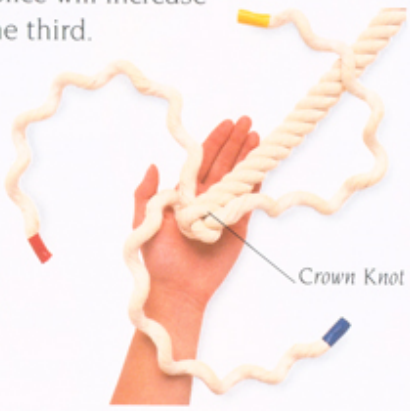
SPLICES & WHIPPINGS

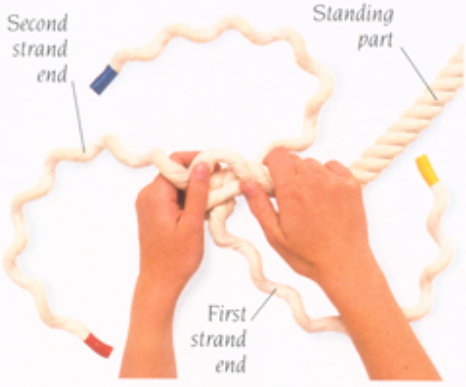
A splice is used to join two lengths of rope of equal diameter, to make a loop at the end of a rope, or to bind the end of a rope. Splices are strong, and once completed are permanent. A whipping binds the end of a rope to prevent the strands from coming undone. Whipping turns must be pulled tight as they are made to prevent them from working loose.

BACK SPLICE

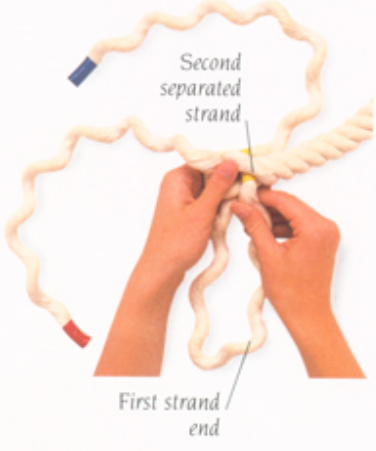
This splice gives a permanent finish to the end of a *three-strand rope* to prevent it from unlaying. Tape (p. 16) the strand ends so that they tuck easily under the *laid strands*. If the rope is stiff, use a *Swedish fid* to separate the strands (opposite). A Back Splice will increase the diameter of a rope by one third.

❶ Tie a Crown Knot (p. 36), leaving long strand ends. Pull the knot tight.

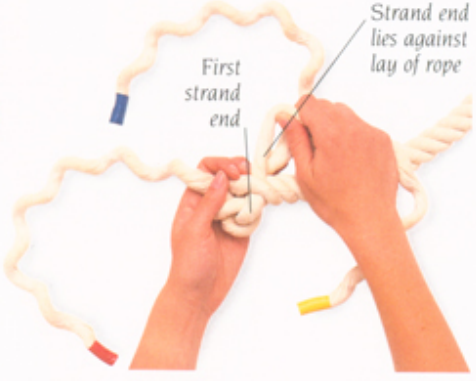




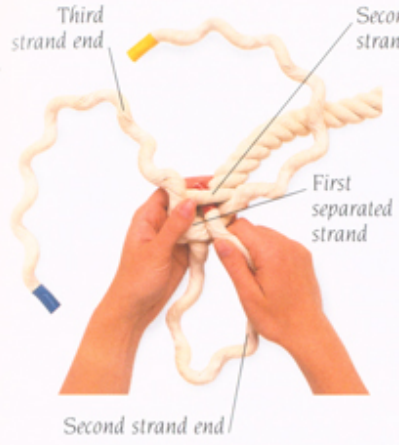
❷ Choose a first strand end. Take the Crown Knot in one hand, and hold the *standing part* between the first and second strand ends in the other hand. Twist the standing part away from you, using the thumb to open up the *lay* of the rope.



❸ Bring the first strand end up and over the first separated strand on the standing part. Tuck it under the second separated strand. Each time you will be tucking the strand ends under themselves.

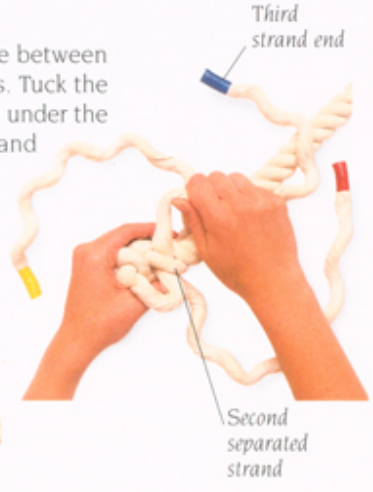


❹ Pull the first strand end through so that it lies snugly in position.



❺ Turn the rope. Repeat Steps 2–4, opening up the lay of the rope between the second and third strand ends. Tuck the second strand end over the first separated strand on the standing part, then under the second separated strand. Pull the strand end through.

❻ Open up the lay of the rope between the third and first strand ends. Tuck the third strand end over and under the separated strands as before, and pull through. This completes one full cycle of *tucks*.



❼ Repeat Steps 2–6 to complete two more cycles of tucks with all three strand ends, pulling them snugly into position after each cycle. Trim (p. 25) the strand ends.

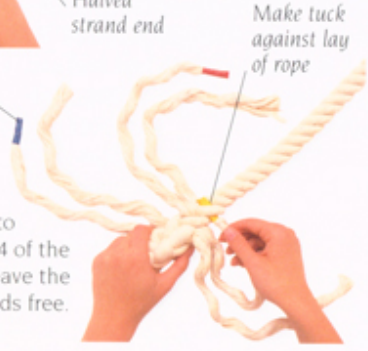
USING A SWEDISH FID

If a rope is stiff, it will be difficult to push its strands apart and tuck the strand ends through by hand. Use a *Swedish fid* to separate the strands, keeping the hollow eye of the fid uppermost. Push the strand end through the hollow eye of the fid so that it passes underneath the strand, then pull through.

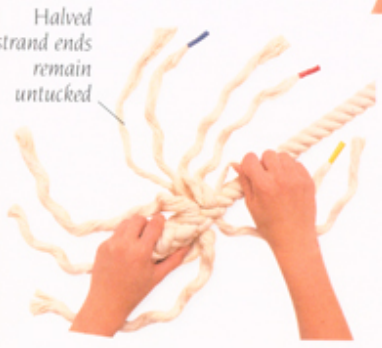
TAPERING A SPLICE

Spliced *three-strand rope* can be tapered before being trimmed to give it a neat finish and to keep it from working loose. Tapering *tucks* are made in the same way as splicing tucks (p. 148), with the strand ends split in half before each cycle of tapering tucks is made.

❶ Take the strand ends of a completed splice, and split each one in half. Replace the tape at the end of one half of each split strand end.



❷ Make tapering tucks with the three strand ends by tucking the taped half of each strand end back into the rope as for Steps 2–4 of the Back Splice (p. 148). Leave the untaped strand ends free.



❸ Split each tucked strand end in half again, taping the end of one half of each as before. Make tapering tucks with the taped strand ends as for Step 2.

❹ Split, tape, and tuck each taped strand end a third time. Trim (p. 25) all the loose strand ends, leaving a short end on the last row of strand ends so that they do not work loose. Work a tapered splice into shape by rolling it underfoot (p. 24).

EYE SPLICE

The Eye Splice forms a permanent *loop* at the end of *three-strand rope*. Three cycles of splicing *tucks* are sufficient for natural rope; five cycles are needed for synthetic rope, since it is more slippery.

❶ Unlay (p. 23) the end of a length of three-strand rope. Fold the rope back on itself in an anti-clockwise direction to form a *loop*, spreading the unlaid strand ends evenly against the *standing part*.

❷ Choose the uppermost strand end, and tuck it under the nearest strand on the standing part, tucking against the *lay* of the rope.

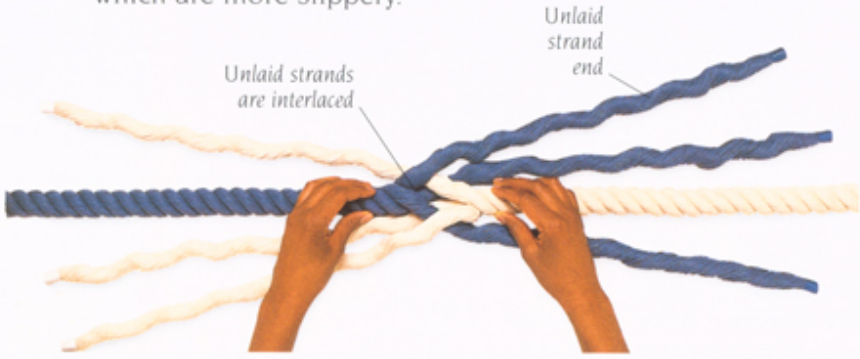
❸ Turn the standing part, and – still working against the lay of the rope – tuck the second strand end under the next strand.

❹ Turn the standing part, and tuck the third strand end under the strand on the standing part lying between the first two strands. This completes a first cycle of tucks.

❺ Follow Steps 2–4 of the Back Splice (p. 148) to make further cycles of splicing tucks. Taper (opposite) or trim (p. 25) the strand ends.

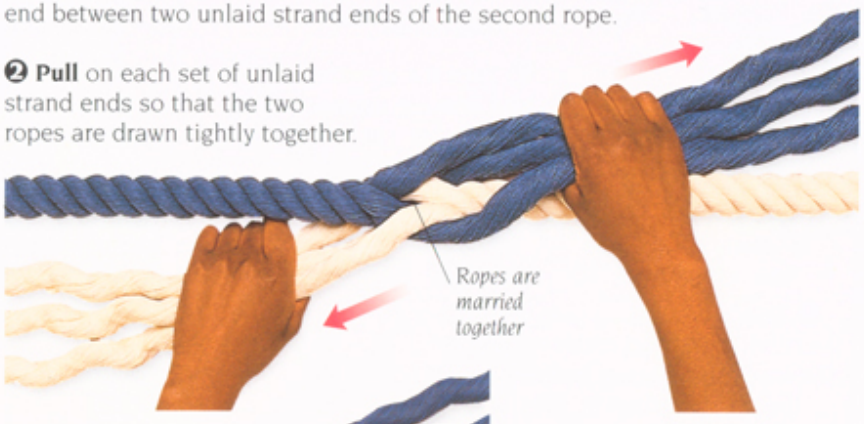
SHORT SPLICE

The Short Splice forms a strong join between two lengths of rope that are the same size and made of the same material. This splice increases the diameter of a rope, and may not be suitable if the rope is to pass through a *pulley block*. Three full rows of *tucks* on either rope are sufficient for natural ropes; five rows will be needed for synthetic ropes, which are more slippery.

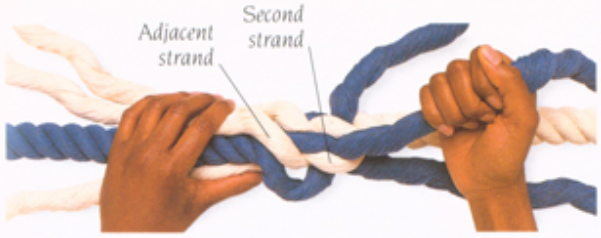


❶ **Unlay** (p. 23) the strands at the ends of two lengths of rope. Lay the two ropes end to end, then insert each unlaid strand end between two unlaid strand ends of the second rope.

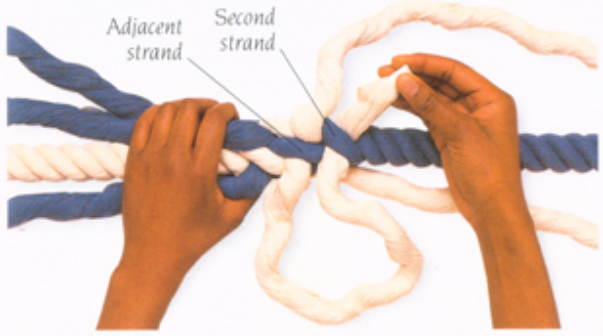
❷ **Pull** on each set of unlaid strand ends so that the two ropes are drawn tightly together.



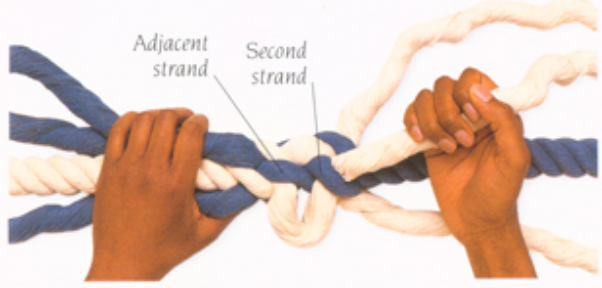
❸ **Pick** up an unlaid strand end and, working against the *lay* of the rope, take it over the adjacent strand from the opposite rope, and tuck it under the second strand of the opposite rope.



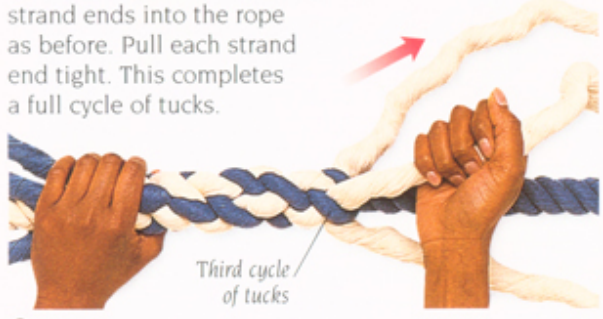
❹ **Roll** the rope towards you, and repeat Step 3 with the second and third strand ends of the same rope, making sure they are tucked against the lay of the rope.



❺ **Turn** the ropes so that they lie in the opposite direction. Tuck one of the unlaid strands over the adjacent and under the second strand of the opposite rope, still working against the lay of the rope.



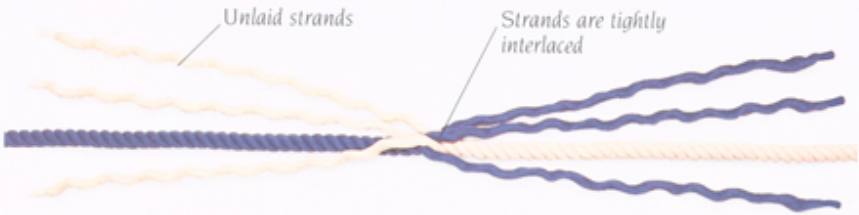
❻ **Tuck** the remaining two unlaid strand ends into the rope as before. Pull each strand end tight. This completes a full cycle of tucks.



❼ **Follow** Steps 3–6 to make additional cycles of tucks with the strand ends, always working against the lay of the rope. Trim (p. 25) or taper (p. 150) the strand ends.

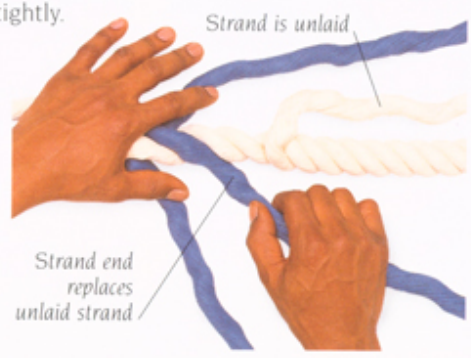
LONG SPLICE

The Long Splice is used to join *three-strand rope* when the increase in the rope's diameter needs to be kept to a minimum so that it can be passed through a *pulley block*. This splice is not as strong as a Short Splice (p. 152).

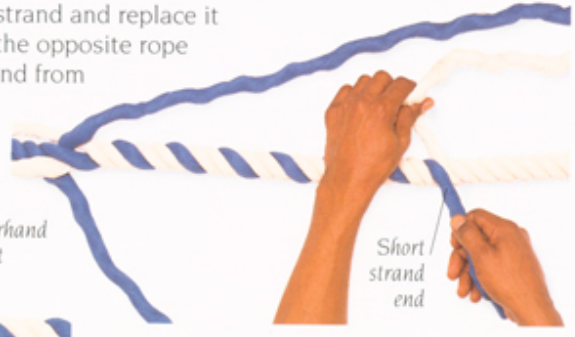


❶ **Unlay** (p. 23) the strands of two ropes to approximately 40 times the diameter of the rope. Lay the two ropes end to end, and interlace the unlaid strands by placing each one between two strands of the opposite rope. Pull on each set of strands to marry the ropes together tightly.

❷ **Holding** the two ropes in place with one hand, unlay a strand in one of the ropes for three or four twists. Replace it with a neighbouring strand end from the opposite rope.

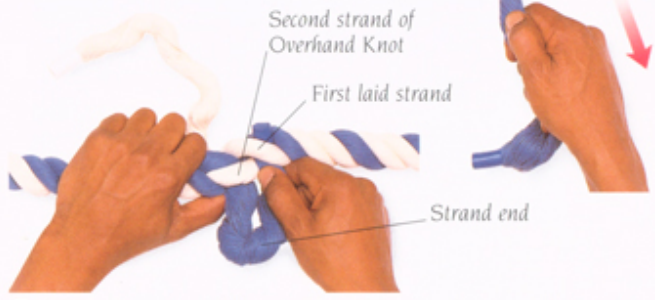


❸ **Continue** to unlay the strand and replace it with the strand end from the opposite rope until only a short strand end from the opposite rope remains.

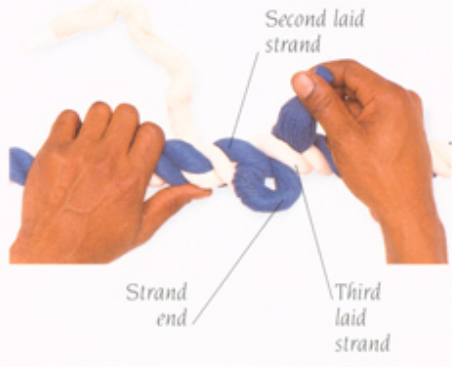


❹ **Repeat** Steps 1–3 to replace a strand in the opposite rope with a strand end from the first rope. Tie an Overhand Knot (p. 28) with the remaining strand ends in the centre and at each end of the splice.

❺ **Pull** each Overhand Knot tight so that the strand ends bed evenly into the *lay* of the rope.

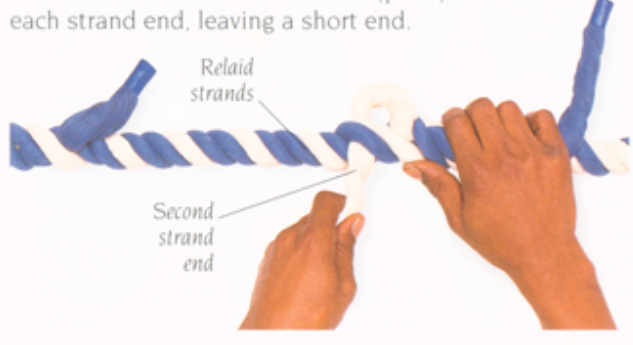


❻ **At** each Overhand Knot, take one strand end, and pass it over the second strand of the Overhand Knot. Tuck it under the first laid strand, working against the lay of the rope.



❼ **Take** the same strand end and, still working against the lay of the rope, tuck it over then under the second and third laid strands.

❽ **Repeat** Steps 6–7 with the second strand end of each Overhand Knot. Trim (p. 25) each strand end, leaving a short end.

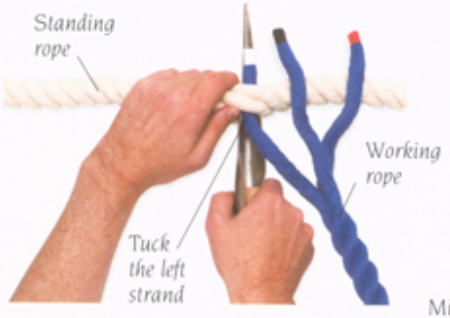


Long Splice: close-up

Long Splice

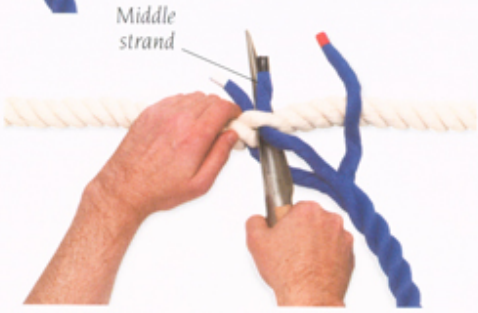
RIGHT-ANGLE SPLICE

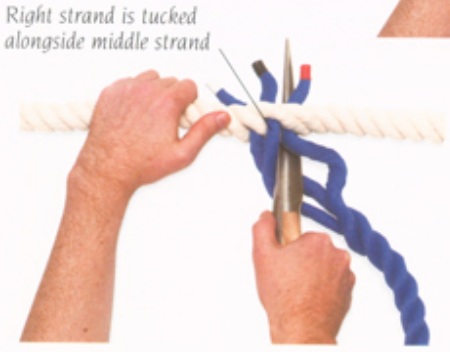
There are times when you may need to join a rope squarely at right angles, perhaps to the outer rope of a cargo net. This neat splice is perfect for such occasions. The ropes used can be of equal size, or a smaller rope can be spliced to a large rope. It is not advisable to splice a larger rope to a small rope.



❶ **Unlay** (p. 23) the working rope and spread the strands out evenly at right angles to the standing rope. Tuck the left strand under two strands on the standing rope.

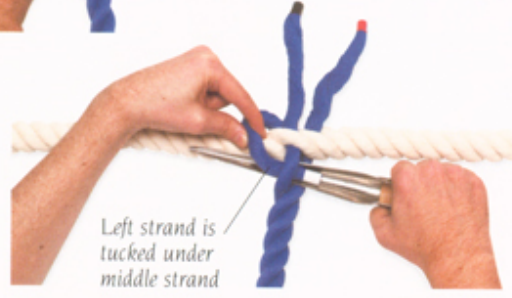
❷ **Tuck** the middle strand under the strand on the standing rope that is on the right side of the tucked left strand. It will come out at the same place as the first strand.

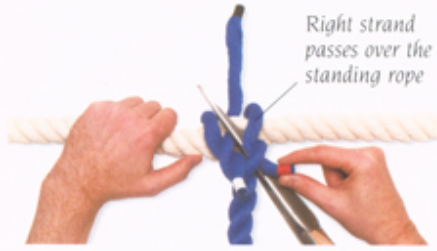




❸ **Tuck** the right strand into the standing rope at the same place as the middle strand, but pass it under two strands.

❹ **Bring** the left strand over the two strands on the standing rope. Tuck it back under the middle strand on the working rope.

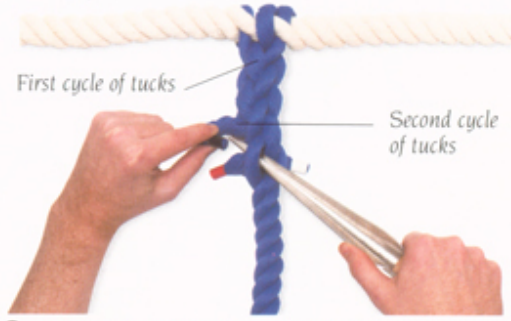




❺ **Bring** the right hand strand over two strands on the standing rope. Tuck it back under the right strand on the working rope.

❻ **Turn** the whole splice over. Bring the middle strand over two strands on the standing rope, and tuck it back under the top strand of the working rope. The three strands should now exit evenly round the working rope.

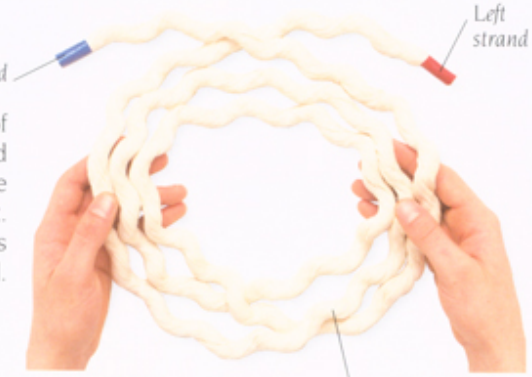
❼ **Make** a series of tucks down the working rope as in the Eye Splice (p. 151).



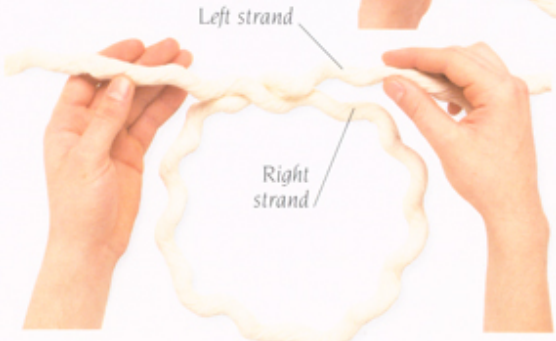
❽ **Make** a total of three full cycles of tucks for natural rope or five full cycles of tucks for synthetic rope. Taper the splice (p. 150) if required and trim (p. 25).

GROMMET

The Grommet uses a single strand from a length of *three-strand rope* to make a strong ring. If the two remaining strands are also used to make Grommets, a set of *deck quoits* for playing on board ship can be made.



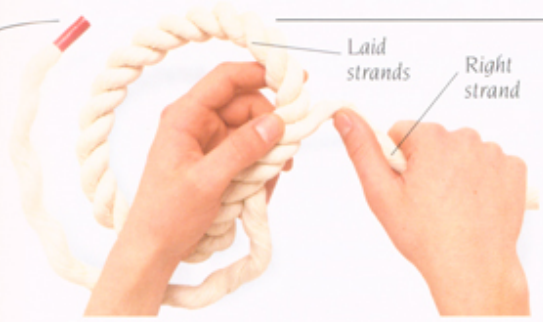
❶ Unlay (p. 23) a strand of rope approximately three and a half times the circumference of the finished Grommet. Keep as much of the twist as possible in the strand.



❷ Lay the strand out in a ring to the size of the Grommet required. Cross the right strand over the left strand.

❸ Working in a clockwise direction, relay the left strand around the grooves of the ring. Apply a slight twist to the left strand as it is worked.

❹ Continue relaying the left strand around the ring until it has been relaid past the right strand and into the next groove.



❺ Working in an anti-clockwise direction, relay the right strand in the grooves between the *laid* strands. Twist the right strand in the direction of the *lay* of the rope as it is worked.

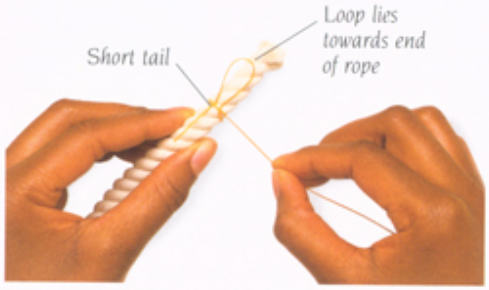
❻ Continue relaying the right strand until it lies in the groove adjacent to the left strand.

❼ Tuck the right strand over and under the left strand to form an Overhand Knot (p. 28).

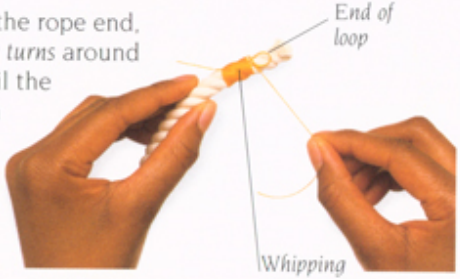
❽ Pull the Overhand Knot tight so that it beds neatly between the adjacent strands. Finish the Grommet as for Steps 6–8 of the Long Splice (p. 154).

COMMON WHIPPING

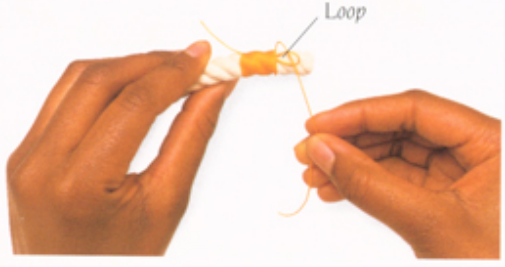
The simplest of the whippings, the Common Whipping is suitable for both *three-strand* and *braided rope*. It can be used to stop the end of a rope from fraying, or to make a mark at any point on a rope. When finishing, it may be helpful to use a Marlinespike Hitch (p. 88) to pull on the short tail so that the *whipping twine* does not cut into the hand.



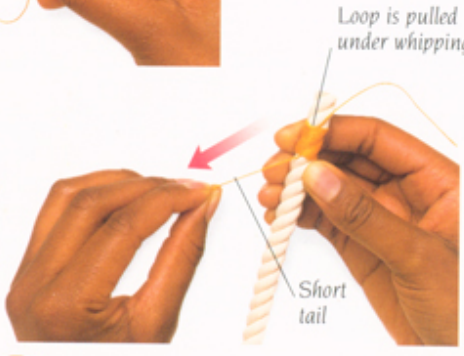
❶ Make a *loop* with a short tail at one end of a length of whipping twine. Lay it along a rope, then wrap the twine first underneath and then around the rope to lock the loop in place.



❷ Working towards the rope end, make a series of *whipping turns* around the rope and loop until the whipping is one and a half times the diameter of the rope. Leave the short tail and the end of the loop free.



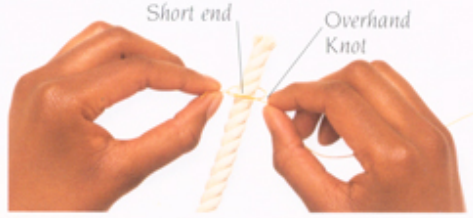
❸ Insert the twine into the loop, and pull it through.



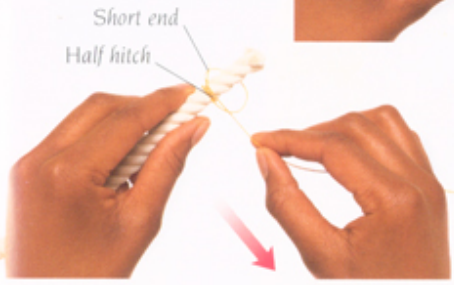
❹ To bury the loop inside the turns, pull tightly on the short tail left at the beginning of the whipping. Trim (p. 25) the ends as required.

FRENCH WHIPPING

The *half hitches* used here create a very tight whipping, with each *turn* locked off from the one before. The half hitches are tied in the same direction to create a decorative spiral effect. A French Whipping, or the more elaborate alternative, the Moku Whipping (below), can be made around tool handles for a good grip.



❶ Tie an Overhand Knot (p. 28) around a rope with *whipping twine*, leaving a short end.

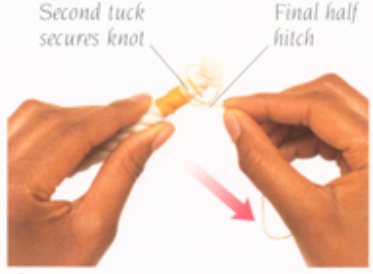


❷ Make a half hitch by taking the whipping twine behind the rope and tucking it underneath itself at the front of the rope. Pull the twine tight, catching the short end in the hitch.

❸ Make a series of half hitches in the same way, pulling each one tight until the whipping is one and a half times as long as the diameter of the rope.

MOKU WHIPPING

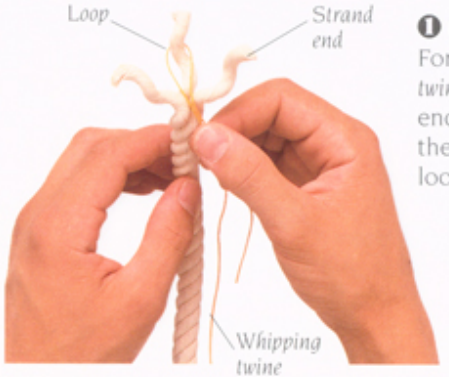
Begin as for Step 1 of the French Whipping (above), leaving two long ends. Tie *half hitches* as for Step 2, using alternate ends. Take the second end behind the rope or handle in the opposite direction to the first. Finish each end as for Step 4.



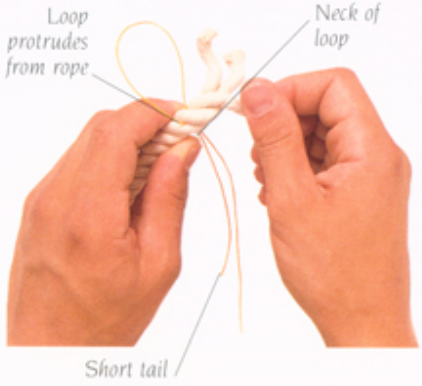
❹ Finish by tucking the twine a second time under the final half hitch. Pull tight, and trim (p. 25) the ends, leaving a short end.

SAILMAKER'S WHIPPING

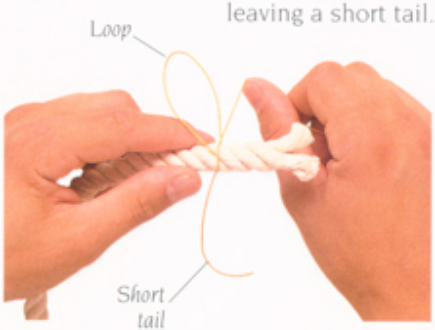
This whipping gives the most secure finish to the end of a length of *three-strand rope*. It has the appearance of a Palm and Needle Whipping I (p. 164) but can be made without a needle or a *palm*. Even though it is not stitched on to the rope, if made carefully it will neither slide off the end of the rope, nor will it easily unravel. When making this whipping, take care to maintain the *lay* of the rope.



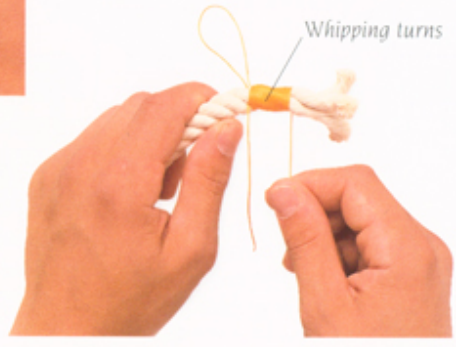
❶ **Unlay** (p. 23) the end of a length of rope. Form a *loop* near one end of the *whipping twine*, and pass it over one of the strand ends so that the neck of the loop lies in the centre of the strand ends. Hold the loop together with a finger and thumb.



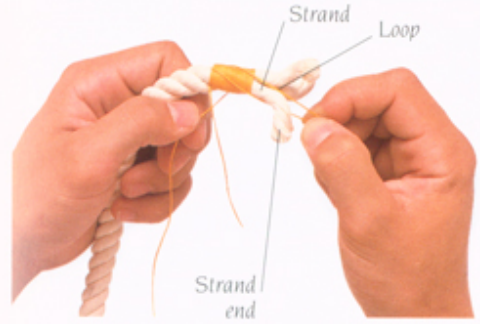
❷ **Relay** (p. 23) the strand ends so that the neck of the loop is caught in the centre of the rope, leaving a short tail.



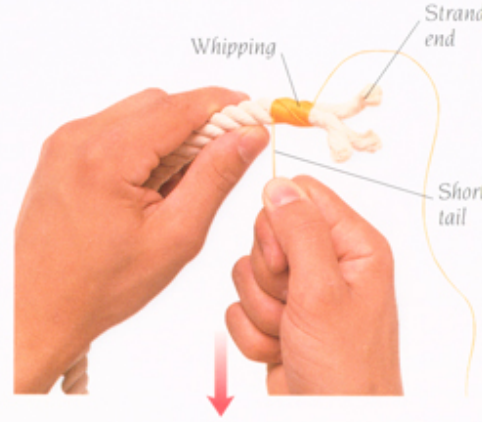
❸ **Working** towards the end of the rope, wrap the whipping twine around the rope. Leave the loop and short tail free.



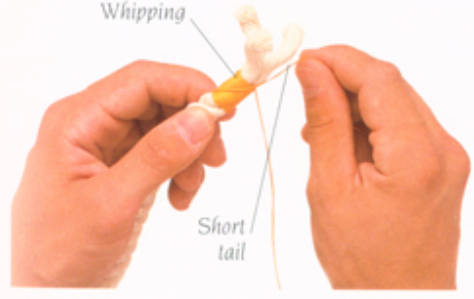
❹ **Continue** to make a series of tight *whipping turns* towards the end of the rope until the whipping is approximately one and a half times the diameter of the rope.



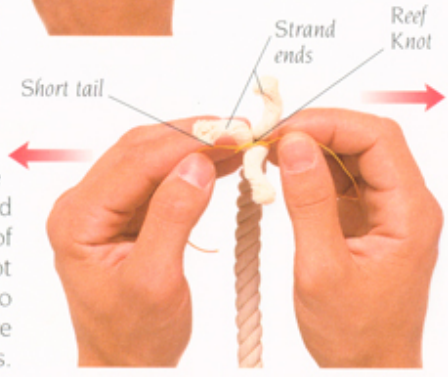
❺ **Pick** up the loop, and pass it over the end of the strand that lies between it.



❻ **Pull** on the short tail so that the loop tightens over the whipping and over the strand end.



❼ **Lay** the short tail over the groove from which it emerges, taking it to the other end of the whipping.



❽ **Bring** the short tail and the whipping twine into the centre of the strand ends from opposite sides of the rope. Tie a Reef Knot (p. 48), and pull it tight so that it beds into the centre of the strand ends.

PALM & NEEDLE WHIPPING I

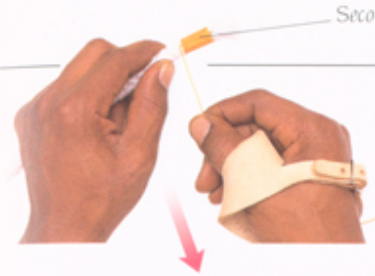
Favoured by *riggers* and sailmakers, the Palm and Needle Whipping requires a *palm* to protect the hand, and a needle threaded with *whipping twine*. The first variation of this whipping works well on braided rope with a core (p. 11), since it locks the core of the rope to its outer layers. The *frapping turns* need to lie as flat as possible in order to avoid unnecessary wear.

❶ Insert a needle towards the end of a length of braided rope. Pull the whipping twine through, leaving a short tail. Working towards the end of the rope, make one stitch on each side of the rope. Catch the short tail in the second stitch, and pull the twine tight.

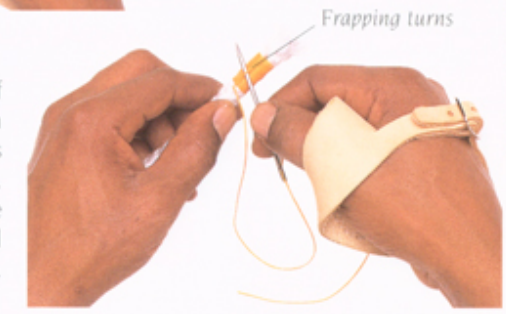
❷ Working away from the end of the rope, and covering the stitches just made, wrap the whipping twine tightly around the rope to form *whipping turns*.

❸ When the whipping is about one and a half times the diameter of the rope, push the needle through the rope at the end of the whipping. Pull the whipping twine tightly through.

❹ Pass the whipping twine over the whipping. Insert the needle through the rope at the end of the whipping, and pull the whipping twine through. Repeat to complete a frapping turn and secure the whipping in place.

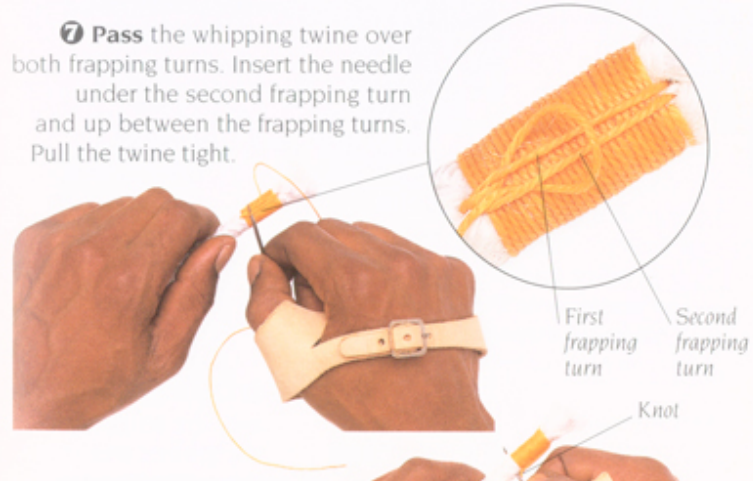


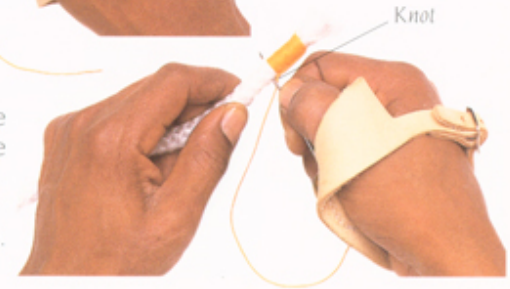
❺ Repeat Step 4 to form a second frapping turn next to the first. Pull the twine tight.



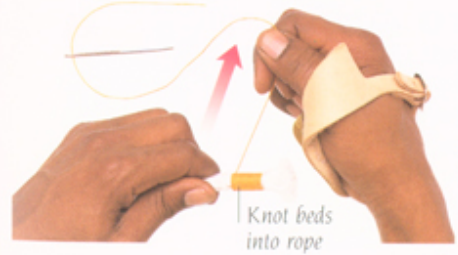
❻ Insert the point of the needle between the two frapping turns from front to back. Pass it under one frapping turn, and pull the thread through.

❼ Pass the whipping twine over both frapping turns. Insert the needle under the second frapping turn and up between the frapping turns. Pull the twine tight.





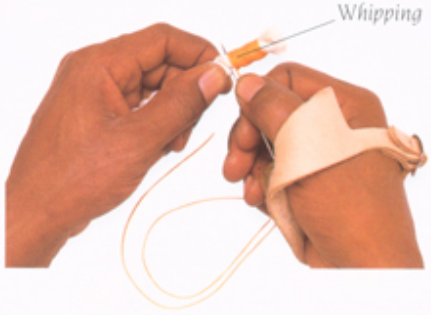
❽ Insert the needle into the base of the knot just formed and through to the other side of the rope.



❾ Pull the whipping twine through tightly so that the knot around the frapping turns disappears into the rope. Trim (p. 25) the whipping twine.

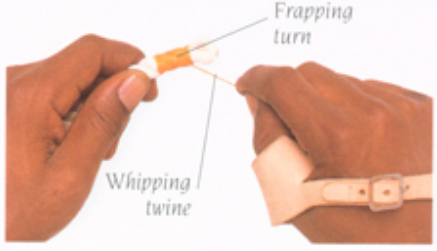
Palm & Needle Whipping II

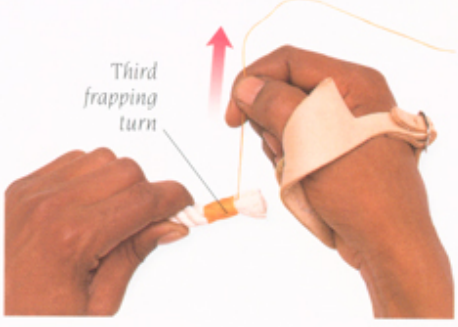
This whipping for *three-strand rope* begins and finishes in the same way as the Palm and Needle Whipping I (p. 164), with the *frapping turns* laid along the grooves of the rope.



❶ **Complete** Steps 1–2 of the Palm and Needle Whipping I. Insert the needle into the grooves on either side of one strand at the bottom of the whipping. Pull through.

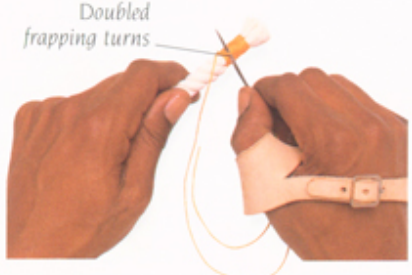
❷ **To** make a frapping turn, lay the *whipping twine* over the line of the groove from which it emerges. Insert the needle through to the next groove. Pull the twine through.





❸ **Lay** the twine back over the whipping along the groove, and stitch through to the next groove. Repeat once more, bringing the needle out through the first groove to make three frapping turns. Pull the twine tight.

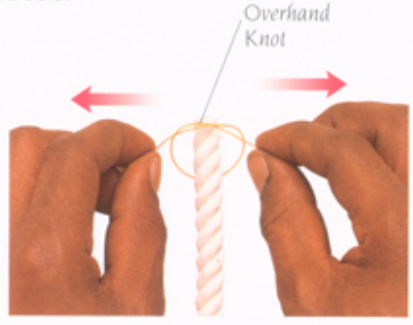
❹ **Make** a second cycle of frapping turns beside the first three. Follow Steps 6–9 of the Palm and Needle Whipping I to finish the knot.

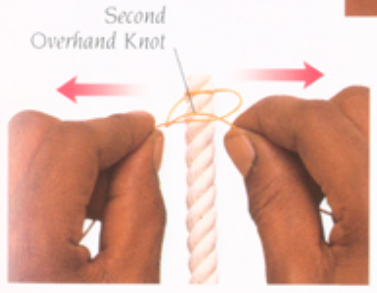


West Country Whipping

The origin of the name of this whipping is unknown. It consists of a series of Overhand Knots (p. 28), and works particularly well around the end of *large-diameter rope* and *cable*. Work back from the end of the rope so that the finished knot will not work loose.

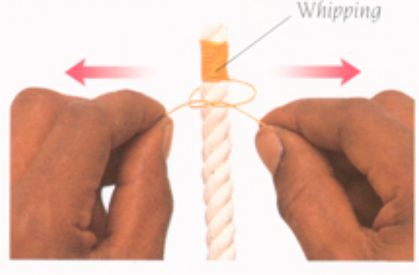
❶ **Form** a loose Overhand Knot in the centre of a length of *whipping twine*, tucking the left strand of the twine through the right strand. Pass the Overhand Knot over the end of a rope, and pull tight.

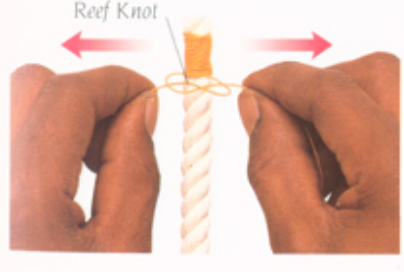




❷ **Turn** the rope over, and tie a second Overhand Knot under the first, tucking the left strand through the right strand as before. Pull tight.

❸ **Continue** to tie a series of Overhand Knots on alternate sides of the rope, working away from the end of the rope, until a whipping of one and a half times the diameter of the rope has been made.

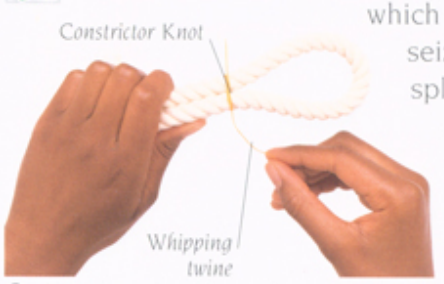




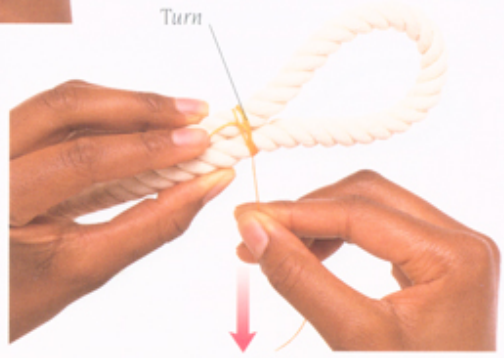
❹ **To** secure the whipping, tie a Reef Knot (p. 48) by tucking the right rope through the left rope after the final Overhand Knot has been made. Pull tight, and trim (p. 25) the ends of the whipping twine.

SEIZING

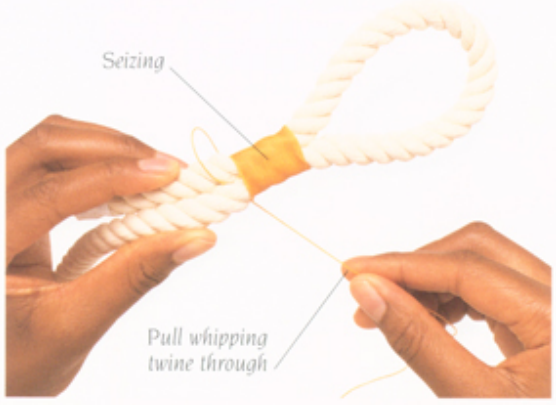
A *seizing* binds two parts of rope side by side. The friction generated by a seizing is sufficient to hold immense loads. For centuries the heavy *standing rigging* on ships, which held the masts in place, was seized rather than knotted or spliced. It is important to tie a seizing evenly and tightly to ensure that it is secure.



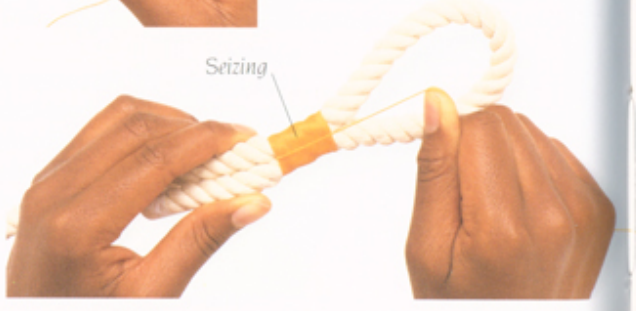
❶ **With** the end of a length of *whipping twine*, tie a tight Constrictor Knot (p. 57) around the two parts of rope to be seized.



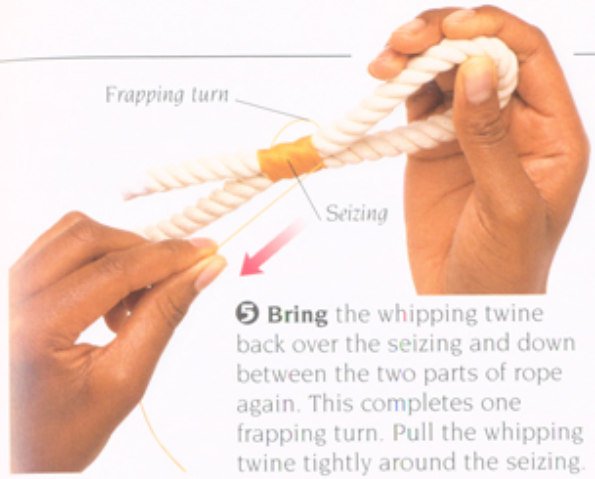
❷ **Make** a series of *turns* around the two parts of rope, tightening each one as it is made.



❸ **Make** enough turns for a seizing three times the diameter of the rope. Begin to secure the seizing with a *frapping turn*, taking the whipping twine down between the two parts of rope.

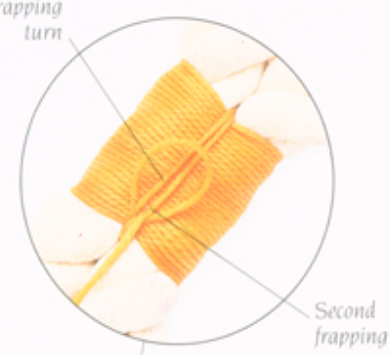


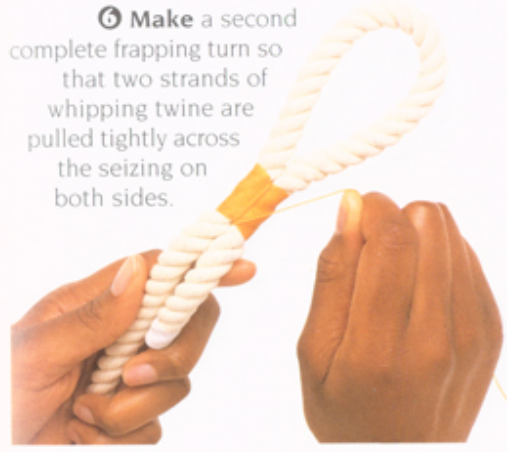
❹ **Take** the whipping twine around the back of the seizing, then between the two parts of rope at the other end of the seizing.



❺ **Bring** the whipping twine back over the seizing and down between the two parts of rope again. This completes one frapping turn. Pull the whipping twine tightly around the seizing.

❻ **Make** a second complete frapping turn so that two strands of whipping twine are pulled tightly across the seizing on both sides.



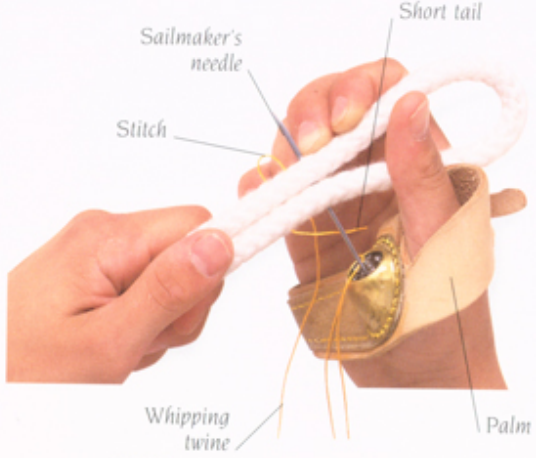


❼ **To** lock the frapping turns in place, bring the whipping twine up between the two parts of rope. Then take it between the frapping turns and under one of the frapping turns. Take the whipping twine over both turns, and tuck it into the centre of the turns.

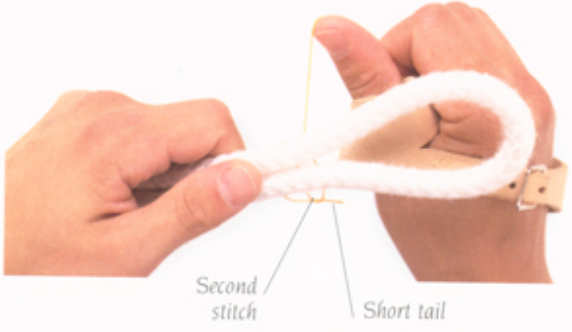
❽ **Pull** the twine tight to draw the knot down between the two lengths of rope. Trim (p. 25) the twine, leaving a short end.

STITCH & SEIZE

Braided rope that has been doubled back on itself can be formed into a permanent *eye* by stitching the two parts of the rope together and making a *seizing* over the stitches. Ensure that the seizing is pulled very tight. Use a sailmaker's needle and *whipping twine* to make the stitches, pushing the needle through the rope with a *palm* to protect the hand.



❶ Make two stitches through the two parts of rope to be bound together, one on each side of the ropes. Catch the short tail of the whipping twine in the second stitch.



❷ Pull on the whipping twine to tighten the stitches so that the short tail lies against the rope.

❸ Wrap the whipping twine around the two parts of rope to make a *turn*. Follow Steps 3–8 for the Seizing (p. 168) to complete the knot.

GLOSSARY

The glossary explains the meaning of terms that occur in this book. It includes terms used to refer to rope and terms used in the instructions for tying the knots. It also explains some specialized climbing and sailing terms. Some entries refer you to the section Using Rope (p. 8–25), where they are more fully explained.

BELAY To attach one climber to another with a rope that will absorb the shock of a fall.
BIGHT **1** A part of a rope that is folded back on itself to form a narrow loop (p. 20). **2** The curved side of a knot.
BLOOD KNOT A knot consisting of many turns, usually angling or climbing knots.
BOAT HOOK A pole with a hook, used to catch hold of a rope, ring, or small boat.
BODY The bulky, tied part of a knot.
BOLLARD A small post made of wood or metal on a boat, ship, or quay. A bollard is used for securing a mooring rope.
BRACE A length of wood or metal used to strengthen or support a structure.
BRAID Strands or yarns woven or plaited together in a regular pattern.
BRAIDED ROPE Rope made by weaving or plaiting strands or yarn together (p. 11).
BRAKING ROPE The part of a rope that can be used to control the amount of slip of a knot, and that will limit the amount of slip of a knot during a fall.
BREAKING LOAD The amount of load that will cause a new rope to break in test conditions. The safe working load of a rope in good condition can be calculated by reducing the test breaking load according to the circumstances in which the rope is to be used (p. 15).

CABLE A large rope made by twisting together three lengths of three-strand rope. Cable is usually S-laid (p. 10).
CHAFE A frayed part of a length of rope caused by the repeated rubbing of the rope against an abrasive surface.
CLEAT A wooden or metal fitting around which a rope is wound to secure it.
COIL Rope made up into a neat series of circles or loops, usually before storage.
CORDAGE A general term used to describe ropes of all types and sizes.
CORE The inner part of a rope made from parallel, twisted, or braided fibres (p. 11).
CROSSING TURN A circle of rope made by crossing a rope over itself (p. 20).

DECK QUOITS Circles of rope used to play a game on board ship in which the circles are thrown over a fixed peg.

ELASTICATED CORD See *shock cord*.
EYE **1** A hole in a knot. **2** The hole inside a circle of rope. **3** A permanent loop made at the end of a length of rope. **4** The opening at the end of a hook through which fishing line is threaded.

FID A pointed tool made from wood used for separating strands of rope.
FRAPPING TURNS Additional turns made across lashing, whipping, or seizing turns. Frapping turns are used to tighten the previous layer of turns.

HALF HITCH A circle of rope made around an object. The circle is kept in place by taking one end of the rope across and at right angles to the other end.
HALYARD A rope used for the raising or lowering of sails on a ship.
HARD-LAID ROPE Three-strand rope that has been twisted very tightly in construction so that it is stiff and firm.
HEAVING LINE A light line that is attached to a mooring rope. It is thrown from a boat and used to haul a mooring rope ashore.
HOLDFAST Any fitting or fixed object to which a rope under strain can be attached to secure it in place.

KERNMANTEL The term for climbing ropes made with a twisted core (kern) and a braided sheath (mantel).

LAID ROPE Rope formed by twisting strands of yarn together (p. 10).
LARGE-DIAMETER ROPE Rope that is about 24 mm in diameter or larger.

LASH; LASHING To secure two or more adjacent or crossed poles with a binding of rope; the term for the binding.
LASHING TURN A turn used to bind poles together as part of a lashing.
LAY The direction of the twist of the strands in laid rope (p. 10).
LEAD The number of strands used to make a plait, used especially with reference to a Turk's Head knot.
LINE A length of rope that is less than 4 mm in diameter.
LOADED ROPE The part of a rope that is used to apply force to a climbing knot.
LOOP A circle of rope made by bringing two parts of rope together without crossing them over each other (p. 20).

MARLINESPIKE A slim, pointed metal cone used to separate strands of rope, usually when untying a knot (p. 21).

NETTING NEEDLE A pointed tool for carrying a quantity of fine line when making a net (p. 21).

PALM A glove-like leather strap fitted with a metal plate (iron). It is worn on the hand to protect the palm when pushing a sailmaker's needle through rope (p. 21).
PULLEY BLOCK Grooved wheels set in a frame, used to gain purchase on rope or to change the direction of its course.

RIGGER A person who specializes in the making of rigging for ships.
RIGGING The arrangement of ropes and spars that control the sails of a ship.
ROUND TURN A complete circle followed by a half circle made with a part of a rope around an object (p. 21).
RUNNING RIGGING Mobile rigging that controls the sails and spars of a ship.

S-LAID ROPE Laid rope with twists following the centre line of the letter "S" (p. 10).
SCREWGATE KARABINER An oval or D-shaped metal snaplink with a screw-locking device, used by climbers.
SEIZE; SEIZING To join two ropes or two parts of a rope by binding them with twine; the term used for the binding.
SHEATH A covering of woven strands protecting a core of rope (p. 11).
SHEET A rope that controls a sail.
SHOCK CORD Rope with a very high degree of stretch, consisting of a rubber elastic core protected by a braided sheath usually made from nylon fibres. Shock cord is also known as elasticated cord.
SHORTENING A knot used to temporarily shorten a long length of rope.
SLING A continuous circle of rope or tape. A sling can be made by tying the ends of the rope or tape with a Fisherman's Knot (p. 74) or a Water (Tape) Knot (p. 77). A sling is also known as a strop.
SMALL-DIAMETER ROPE Rope that is about 4–8 mm in diameter.
SMALL STUFF A general, imprecise term for small-diameter rope or line.
SPADE END The flattened end of a hook that has no eye for threading line.
SPAR The term for a wooden or metal pole used on a ship.
STANDING PART The reserve amount of rope not immediately active during the tying of a knot (p. 20).
STANDING RIGGING Rigging that is fixed in position on a ship.
STROP See *sling*.
SWEDISH FID A tool with a hollow, pointed metal blade, used for tucking strand ends when splicing stiff rope.

TAPE Flat woven webbing used by climbers to make slings.
THIN LINE A length of line that is less than 2 mm in diameter.
THREE-STRAND ROPE Rope made of three strands twisted together (p. 10).
TUCK The passing of one part of a rope underneath another part.
TURN The passing of a rope around one side of an object (p. 21).

UNLAID ROPE Rope that has been separated into its component strands.

WHIPPING TURN A turn made around the end of a rope as part of a whipping.
WHIPPING TWINE Thin line, often made of nylon, used to bind the end of a rope.
WORKING END The end of a rope used during the tying of a knot (p. 20).
WORKING LOAD The maximum load that should be put on a rope while it is in use.

YARN Natural or synthetic fibres that have been twisted into threads.

Z-LAID ROPE Laid rope with twists following the centre line of the letter "Z" (p. 10).

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