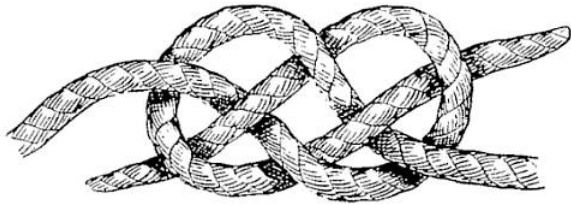


## Knots and Splices

Toronto Brigantine  
Grade II



Most of the images in this lecture are from the following eBook (copyright expired)  
Knots, Splices and Ropework. A. Hyatt Verrill <http://www.gutenberg.org/files/13510/13510-h/13510-h.htm>

1

## Types of Rope Fibres

- Traditionally made from manila hemp, hemp, linen, cotton, coir, jute, and sisal.
- Most rope is now made from synthetic fibers such as polypropylene, nylon and dacron.

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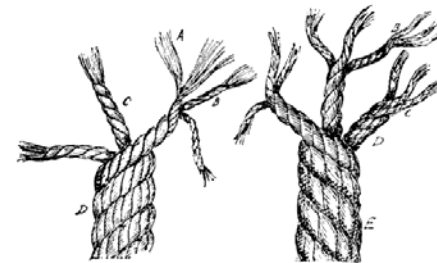
## Types of Rope fibres

- Polypropylene:  
Stiff, hard to work with, hard on the hands, very little stretch, easily damaged by UV and heat, Floats
- Nylon:  
easy to work with, looses shape, easy on the hands, doesn't float, can stretch up to 40% of its length, weak when wet
- Dacron:  
easy to work with, maintains shape, easy on hands, doesn't float, not as stretchy as nylon
- Roblon:  
Synthetic material (from Denmark) that looks like natural fiber, used on replica vessels

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## Rope Making

- Many fibres (A) are twisted together to form yarn (B)
- Many yarns are twisted together to form strands (C)
- Strands are twisted together to form rope (D)
- Rope is twisted together to form cable (E)



Knots, Splices and Ropework. A. Hyatt Verrill <http://www.gutenberg.org/files/13510/13510-h/13510-h.htm>



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## Rope Making

- The direction the strands are twisted together is called the lay; either right or left
- The twist of the yarn is opposite to that of the strand, and that in turn is opposite to that of the rope.

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## Traditional Rope Making

- Rope was made in a rope walk or ropery
- A traditional operational ropery remains in Chatham England. It is 346m (1135 ft) long, and when constructed was the longest brick built building in Europe capable of laying a 1,000 ft (300 m) rope

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## Making Rope



Fibres

Fibres being made into yarn

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The three strands are being twisted in one direction

8



traveller

The traveller is being turned in the opposite direction, twisting the strands together



Top

The top is slid along between the three strands as they are twisted together, keeping the tension between the strands

## Braided vs 3-laid line

- Braided is generally stronger for a given size and material compared to 3-laid
- 3-laid has more stretch which makes it good for mooring lines or anchor rode on smaller vessels.
- Braided line is more expensive
- Braided line is harder to work with (harder to splice)
- 3-laid line is used more on tall ships because of the cost, the ease of working with it and the more traditional look.

## Working with Rope

- Coil your lines so they are ready for use
- Store unused lines in a dry location
- Prevent chafing:
  - use chafing gear for mooring lines
  - lines should be led so that they don't chafe on standing rigging or other parts of the vessel

## Coiling – simple but very important

- Normal right laid rope should be coiled *with the sun*, or clockwise, to prevent kinking.

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## Knot terminology

- **Line** – Rope
- **Bitter end** – the very end of the line
- **Working end** – when tying a knot, the end of the line you are working with
- **Standing end** – the end you are not working with, or the end attached to something like a sail or fender
- **Bight** – when tying a knot, a loop or a large bend
- **Turn** – a bight that is created around something
- **Round turn** – a turn that goes all the way around something and back on itself



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## Knots for Grade 1

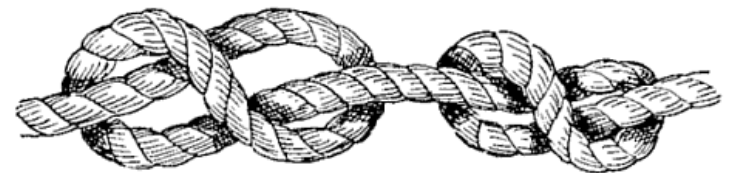
- Figure of Eight
- Reef
- Clove hitch
- Rolling hitch
- Round Turn and Two half hitches
- Bowline
- Sheet bend

Check out this website: [www.animatedknots.com](http://www.animatedknots.com)

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## Figure of Eight

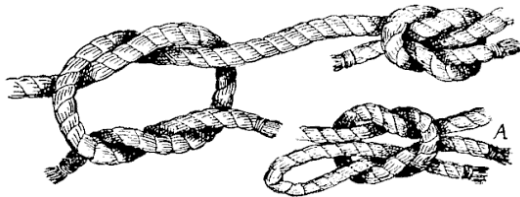
- Also called the stopper knot
- Usually tied near the end of a line, preventing it from running through a block or fairlead



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## Reef Knot

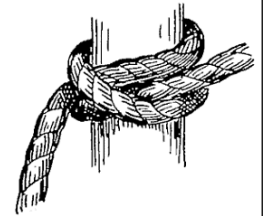
- Also called a square knot
- Used to tie together two lines with a similar diameter (eg. tying reefing points when reefing)



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## Clove Hitch

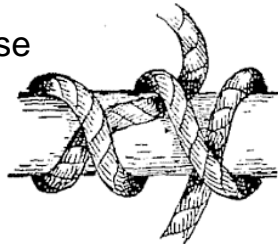
- Very useful on board
- Used to secure a line to an object (eg bucket to lifeline, gasket to jackstay when furling)



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## Rolling Hitch

- used to attach a rope to a rod, pole, or other rope.
- A simple friction hitch, it is used for lengthwise pull along an object rather than at right angles.
- designed to resist lengthwise movement for only a single direction of pull



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## Round Turn and Two half hitches

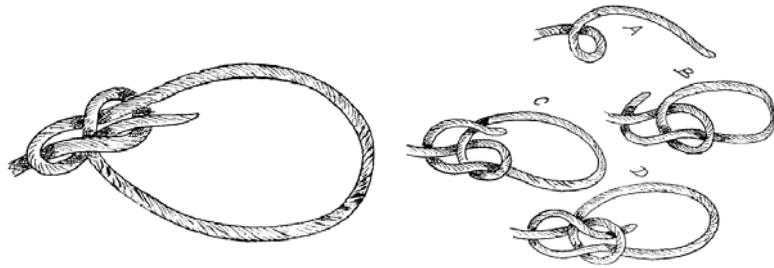
- This is a multipurpose knot
- Used to tie fenders onto the boat etc.



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## Bowline

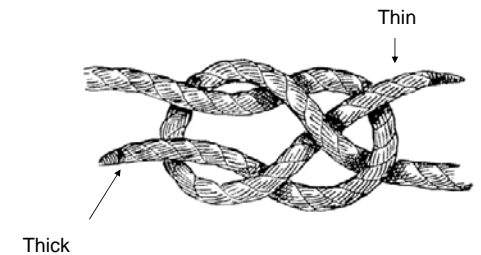
- Multipurpose knot
- Doesn't slip, easy to tie and untie



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## Sheet Bend

- Similar to reef knot
- Used to tie together two lines of different diameters



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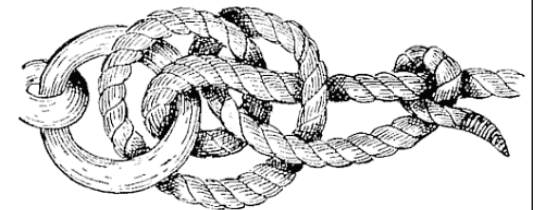
## Knots for Grade 2

- Anchor (Fisherman's) Bend
- Bowline on a bight
- Sheep Shank
- Backsplice
- Eye splice
- Short Splice
- Mousing
- Seizing
- Whipping

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## Fisherman's Bend

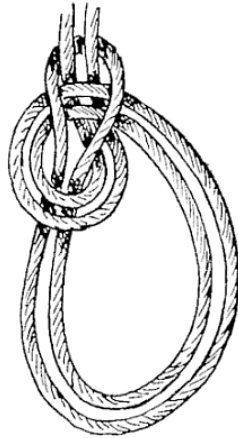
- Used to attach an anchor line to the anchor
- The end of the line must be seized to the standing part to prevent the knot from coming undone while the anchor is set



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## Bowline on a Bight

- Used to make slings or make-shift boatswains chairs



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## Sheep shank

- Used to reduce the length of a line
- It can also be used to circumnavigate a damaged portion of a line



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## Back Splice

- Prevents a line from fraying at the end
- Acts as a type of stopper knot
- Be careful where you put these, as they make untying a knot extremely difficult



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## Eye Splice

- Used to create a loop at the end of a line
- Thimbles (metal) are often inserted in the eye to prevent wear and to spread the load



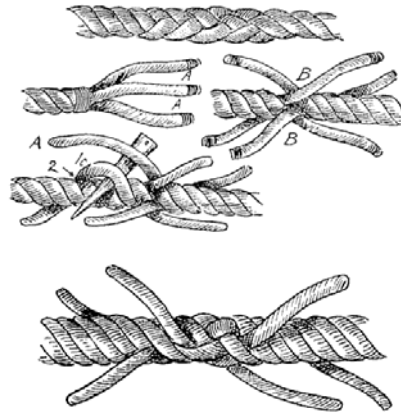
Thimbles



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## Short Splice

- Used to join two lines together
- Increases the diameter of the line so it isn't suitable for lines that go through blocks
- A long splice should be used when you want to maintain the same diameter (but a long splice doesn't have very much strength)



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## Mousing

- Applied to shackles to prevent the shackle pin from turning – Shackles lose a lot of their strength if the pin isn't tight.
- Can be done using whipping twine, seine twine or mousing wire
- Hooks can also be moused to prevent them from coming “un-hooked”

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## Seizing

- Used to secure two lines together, or secure lines to other objects
- ratlines to shrouds, sail to jackstay (robands)
- There are many different seizings, for different applications, but the three most common are Square, Round and Racking



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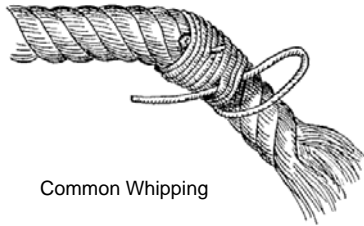
## Whipping

- A Whipping is done around the end of a line to prevent it from fraying
- There are several different types, at TBI we use two:
- Common Whipping (done without a needle)
- Sailmaker's whipping (using a palm and needle)

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# Whipping



Common Whipping

