

## **9. Knots**

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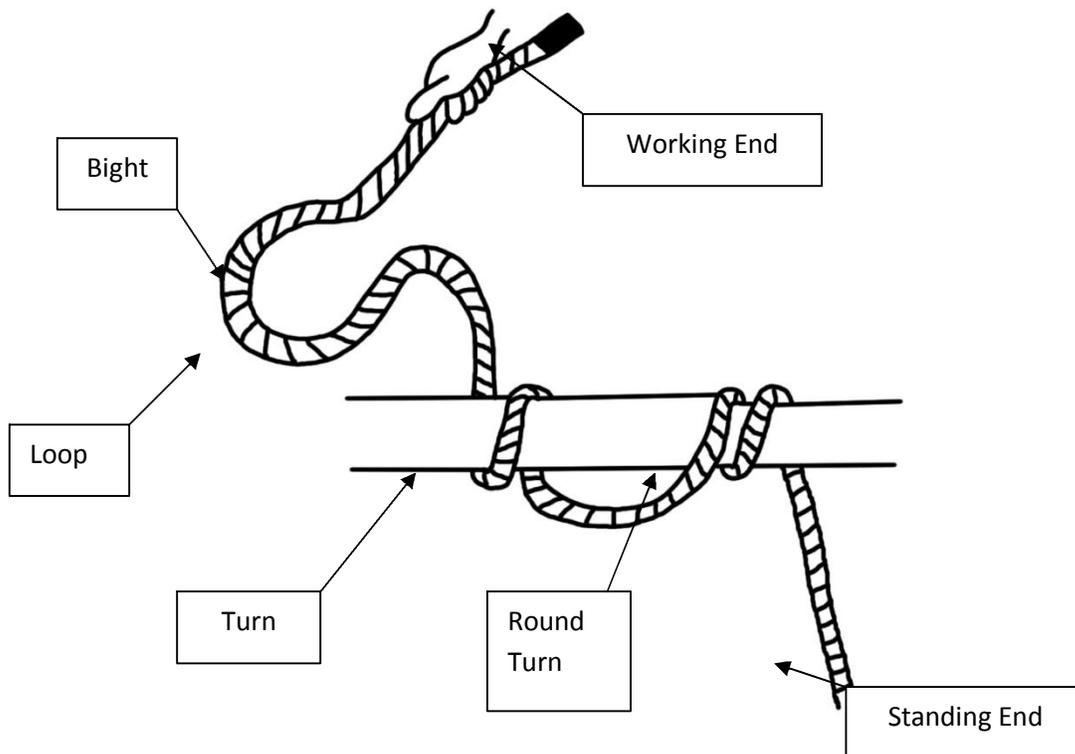
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## 9.0 Common terms of ropes

- WORKING END is the rope end that is used to tie a knot.
- STANDING END is the inactive rope end.
- LOOP is rope formed into a circle, but without being crossed over itself.
- BIGHT is the enclosed area that is formed by a loop.
- TURN is rope that passes around only one side of an object.
- ROUND TURN is rope that completes one and a half circles around an object.



### **Useful points to REMEMBER**

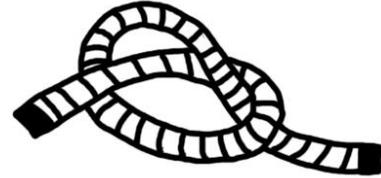
- A knot uniting two ropes reduces the strength of the unit to about half that of the weaker rope.
- A rope that is twice the diameter of another has four times its strength.
- Never use two ropes of different materials together, as only the more rigid rope will work under strain.
- Do not cut ropes unnecessarily, use shortening formations instead.
- Repair fraying ends immediately; apart from looking untidy, they quickly consume yards and yards of rope.

## 9.1 Stopper Knots

- Prevent ropes from fraying
- To stop rope from slipping through a knot or hole
- To weight the rope
- To provide a handhold

### **9.1.1 Thumb Knot (Overhand Knot)**

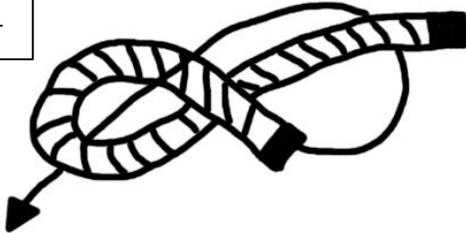
- Once tied and put under strain, it is difficult to untie.



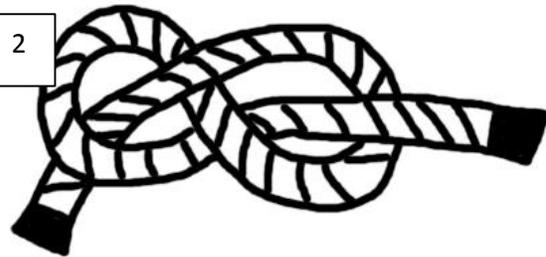
### **9.1.2 Figure-of-Eight Knot**

Compared to thumb knot, when it is tied and under strain, it is much easier to be untied.

1



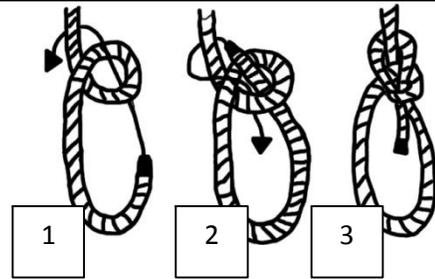
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## 9.2 Loop Knots

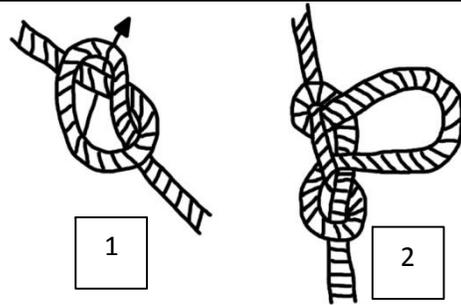
### 9.2.1 Bowline

- The bowline does not jam or slip easily, despite under severe strain.
- It may not hold, if very rigid and slippery ropes are used.
- For extra security, a stopper knot or 2 half hitches around the loop.
- It is used to secure a rope to a ring or eye.



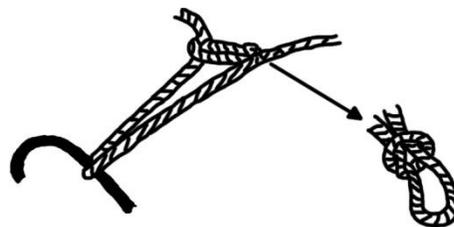
### 9.2.2 Manharness

- The loop can act as a handle for hauling of objects.



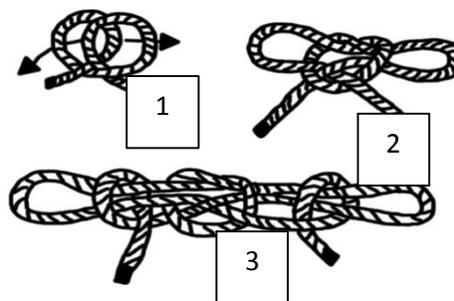
### 9.2.3 Tent Guy Loop

- Tie a slipknot before inserting the working end into it. Thus, this creates an adjustable loop.
- It also acts as a pulley, giving mechanical advantage in the tightening of guylines.



### 9.2.4 Fireman's Chair

- It is used to lower a casualty from higher grounds.

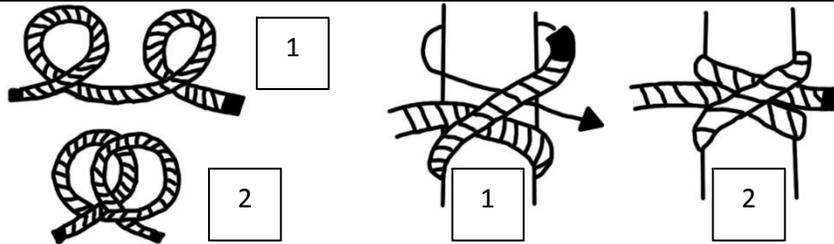


## 9.3 Hitches

- Hitches are used to tie a rope to an object, like spar, or ring.

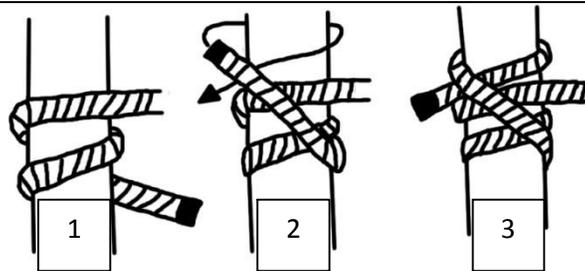
### 9.3.1 Clove Hitch

- Made of 2 half hitches, it is used to start and anchor rope obstacles.



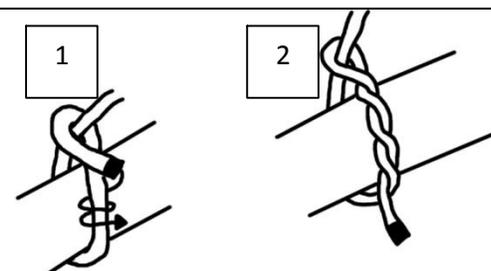
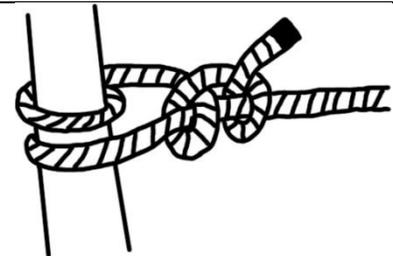
### 9.3.2 Rolling Hitch

- It is also used extensively to start and anchor rope obstacles.  
- It is actually made up of a round turn and half hitch. Therefore, it is easily untied. However, when strain acts on it, it tightens easily too.



### 9.3.3 Round turn two half hitches

- It can secure a rope to a spar, eye or ring. The round turn takes any strain applied to the knot while the 2 half hitches keep the round turn in place.

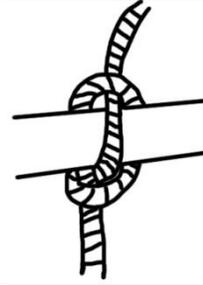


### 9.3.4 Timber Hitch

- There is actually a loop encircling the standing end.  
- The tightness of the hitch depends on the strain. The greater the strain, the tighter it becomes. However, it is easy to untie.

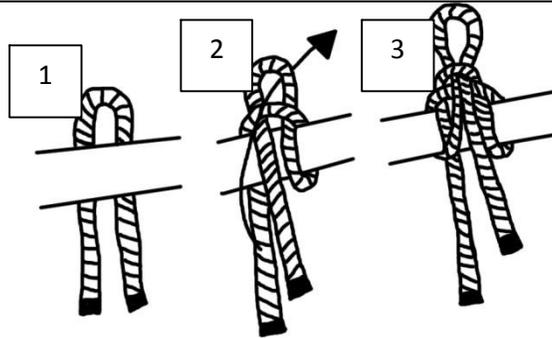
### 9.3.5 Marlinspike

- It is used in nautical activities as well as making rope ladders. It is tied using a thumb knot first.



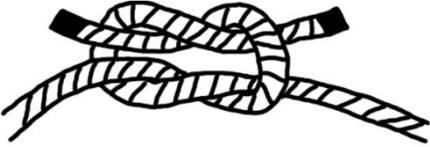
### 9.3.6 Highwayman's Hitch

It can undo itself when one of the ends is pulled. Thus, it applies in situations that need quick release of rope.

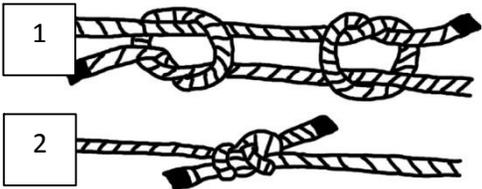


## 9.4 Bends

- For joining two ropes

	<p><b>9.4.1 Reef Knot</b></p> <ul style="list-style-type: none"><li>- Used to join two ropes of equal thickness.</li><li>- Used for parcel tying as well as First Aid bandaging because it is flat and easy to tie.</li><li>- Compared to other bends, it is not secure as it comes undone easily. Capsize the rope to untie.</li></ul>
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<p><b>9.4.2 Sheet bend</b></p> <ul style="list-style-type: none"><li>- Used for joining rope together, especially those of unequal thickness.</li><li>- It is quick and easy to tie and untie.</li><li>- It can be further secured by making an additional turn, forming double sheet bend.</li><li>- Ending the working ends at alternate sides would weaken this knot severely.</li></ul>	
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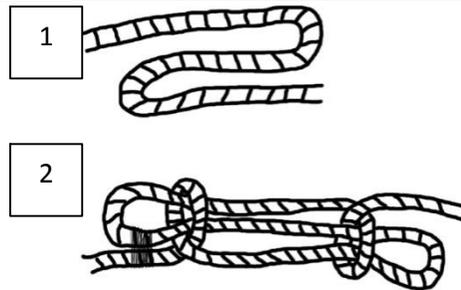
<p><b>9.4.3 Fisherman's Knots</b></p> <ul style="list-style-type: none"><li>- It is made of 2 sliding thumb knots, which will lock with each other when strain is applied.</li><li>- It applies in joining ropes together, especially those small and equal diameters.</li></ul>	
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## 9.5 Shortening Formations

- When ropes are too long, shortening formations are used instead of cutting the ropes.

### **9.5.1 Sheepshank**

- It shortens ropes without cutting them.
- It is also used to bypass worn section in centre of the knot and thus the section will not be under strain.
- The half hitches at the two ends will ensure that when there is no strain, the knot can undo itself easily.
- To further secure the knot, one can seize the side as seen in (2).



### **9.5.2 Chain Knot**

- Shorten ropes, especially those of small diameters. For example, male cadets shorten their bootlaces using this knot.
- It can be undone quickly by a pull.

