

- **YARN NUMBERING SYSTEM :**

- **Direct System :**

- Yarn no. is expressed as mass per unit length.
- Two methods of yarn numbering system.

- **(i) Denier system :**

- Most commonly used system for denoting size of yarn.
- It is the wt in g of 9000 m of a single yarn.
- Symbol used to designate is 'Td', 'Den' or 'D'.
- Most commonly used nylon yarn for netting twine is 210 denier i.e. 9000 m of a single yarn weighs 210g

- **(ii) Tex system :**
- **International numbering system recommended by ISO.**
- **It is the wt in g of 1000 m of a single yarn.**
- **‘Tex’ is the symbol for the system.**
- **In both systems as count increases, the thickness of yarn increases.**
- **Denier value can be converted to Tex by multiplying with a factor 0.111 & Tex to Denier by multiplying with 9.**

- **Indirect System :**
- **Expressed in terms of length per unit mass. Three types are there:**
- **(i) Metric system :**
- **It is length of a single yarn the weight of which is one Kg i.e 1000 m of yarn weighing 1 kg is 1 Nm**
- **Symbol used is ‘Nm’.**
- **(ii) British system :**
- **This gives no. of hanks, each measuring 840 yards in a unit mass of English pound (1lb).**
- **Expressed as ‘Ne’.**
- **840 yards of a single yarn weigh 1 lb = 1 Ne**
- **840 X 20 yards of single yarn weigh 1 lb = 20 Ne**

- (iii) Runnage system :
- Used in purchase of finished twines & ropes.
- It indicates the length per unit weight & units are m/kg, yards/lb & feet/lb.
- Conversion formula of various systems :
  - $\frac{590.5}{\text{Ne}} = \frac{1000}{\text{Nm}} = 0.111 \text{ Td.}$
- $\text{Tex} = \frac{\text{Ne}}{\text{Nm}}$

- **Code number :**
- Specifies the no. of single yarns in a folded yarn & expressed in numbers.
- Occasionally used to specify nylon & cotton.
- **Diameter :**
- Given in mm & used to specify twines & ropes.
- Eg. Monofilament, manila twines, sisal twine, steel wire ropes, fibre ropes.
- **Circumference :**
- Often used (in mm) to specify the fibre ropes.

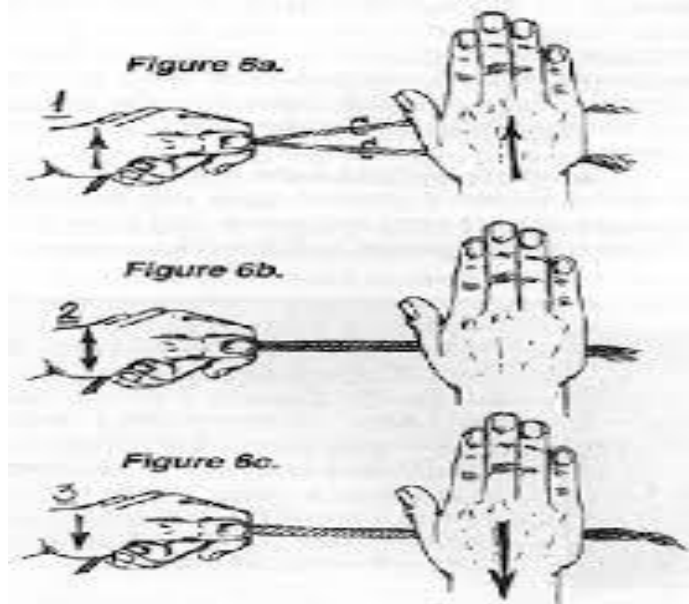
- **Twine** is a light string or strong thread composed of two or more smaller strands or yarns twisted together. More generally, the term can be applied to a cord.
- Natural fibres used for making twine include cotton, sisal, jute, hemp, henequen, and coir. A variety of synthetic fibres may also be used.



Spool of twines

# Rope

- A rope is defined as a cordage with circumference of 25 mm or more.





- Ropes find a varieties of uses both in fishing vessels and fishing gear.
- In fishing gear like purse seine and trawl, they prevent the fish from escaping.
- It is attained by using purse line in the former and cod line in the latter.
- In seines they shepherd to guide the fish in to the net and help in towing the gear.

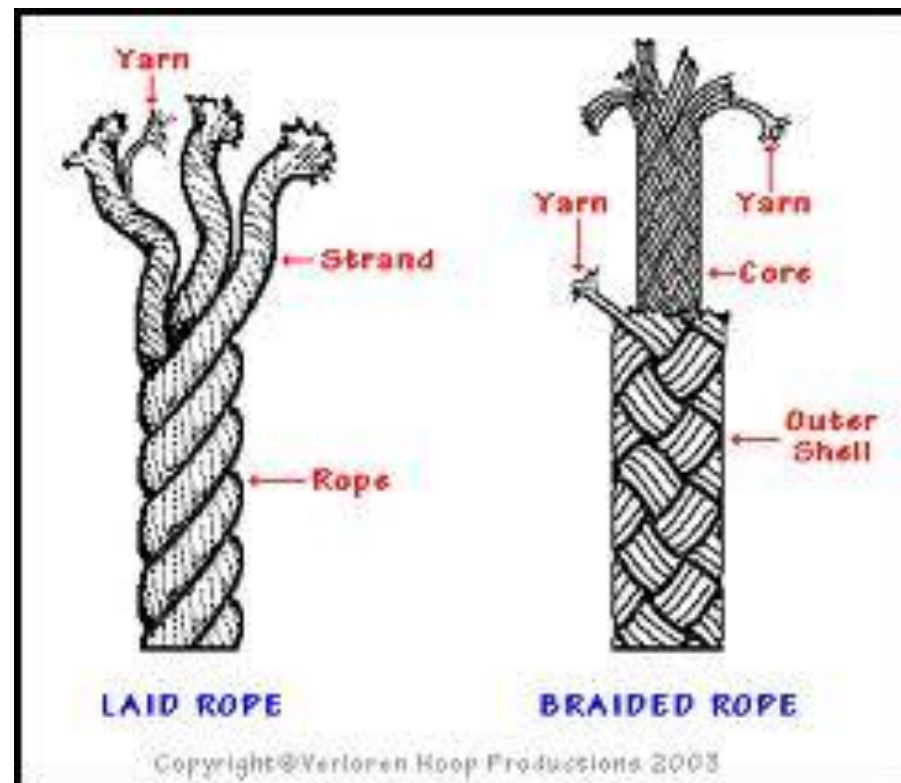
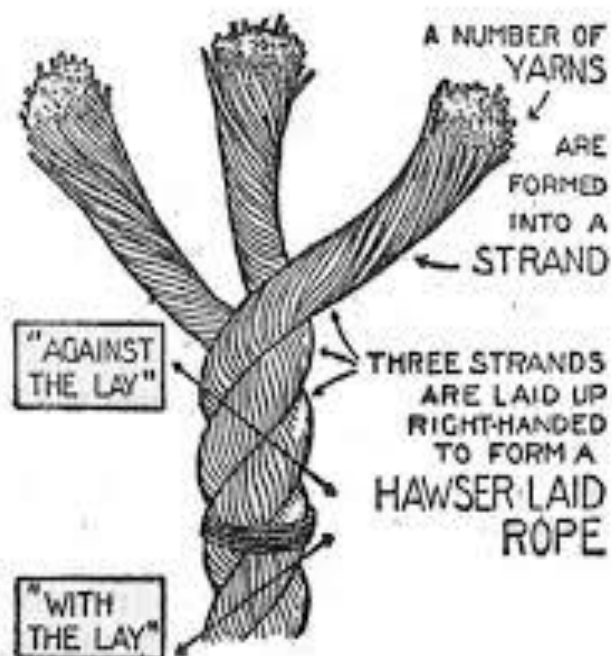
- There are four types of ropes based on the raw materials used for their fabrication:
- Vegetable fibre ropes : Among the vegetable fibre ropes, the more commonly used are those made of manila, sisal and coir. However, the vegetable fibre ropes have almost been replaced by synthetic ones except in ceratin undeveloped and developing countries.

- Synthetic fibre ropes : These are becoming popular due to their high breaking strength , rot resistance, uniformity and continuity. The more commonly used synthetic fibres ropes are
- (i) PA (Continuous filaments and monofilaments)
- (ii) PES (Continuous filaments )
- (iii) PE (monofilaments)
- (iv) PP (Continuous filaments ,discontinuous filaments, monofilaments, fibrillated film tapes)

- Besides PVAA and PVC as staple fibre ropes are also used in Japan.
- Metal wire ropes : These are commonly used in fishing as warps and other lines and very strong.
- Combination ropes : These are formed by a combination of natural or synthetic fibres and steel wires. They are easier to handle, flexible and run less risk of injury to the user. They are mostly used in trawling.

# Fabrication of fibre ropes

- Laid ropes : The fibres are spun and twisted in to rope yarn. Two or more rope yarns are twisted in to a strand. Several strands are laid in a rope. The direction of twist is opposite to that of the preceding one. In case of a cable laid rope, several laid ropes are twisted.



- Metal wire ropes : A definite number of wires of particular size are fabricated in a uniform geometric arrangement to form a strand of required diameter. The required number of strands are then laid together around a core to form the rope.
- Combination rope : The combination ropes are either a combination of natural fibres and steel wires or synthetic fibre and steel wires. PP monofilaments and PP film fibres are most commonly used.

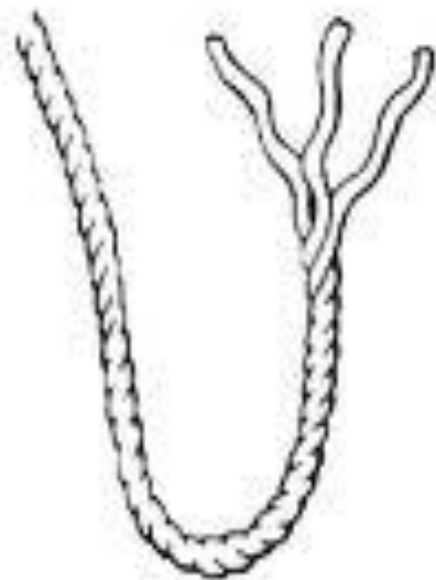
- Specification and identification of ropes : The ropes are specified by diameter or circumference in mm. The steel wire rope is normally specified by diameter and fibre ropes by circumference.
- The burning test is best used to distinguish between manila and sisal. Manila leaves a dark grey ash while sisal leaves white ash. The coir rope is identify by visual inspection of fibres as they are yellowish brown to reddish brown in colour.



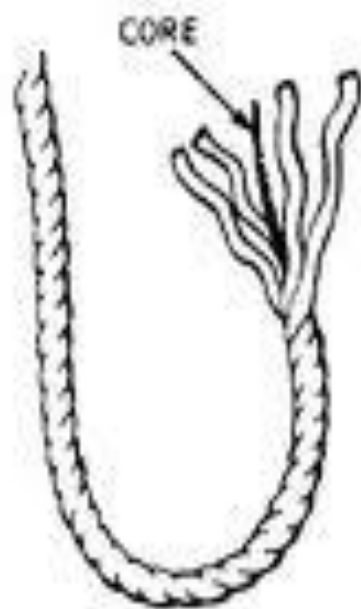
# Classification of ropes

- Based on the material used and their structure, the ropes are broadly classified as (a) fibre ropes (b) metal wire ropes and (C) Combination rope. The fibre ropes are further classified as vegetable fibre ropes, e.g. those made from coir, manila, sisal, hemp, cotton etc. and synthetic ropes made from PA, PES, PP, PE, PVAA, PVC etc.

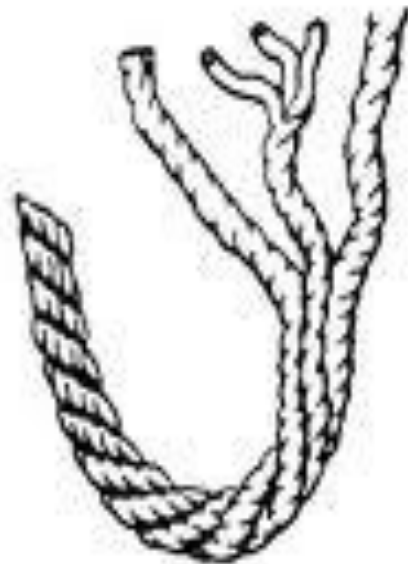
- Laid ropes : They are formed by twisting the strands in helical formation. Hawser laid rope is a three strand rope with the strands in helical formation. A four-strand laid rope with strand in helical formation called shroud laid rope. In cable laid rope, the strands consists of ropes cabled together in the opposite direction to the lay of the constituent ropes.



**Hawser-  
Laid Line**



**Shroud-  
Laid Line**



**Cable-  
Laid Line**

- Braided ropes : They are formed by braiding where the strands are interlaced in such a way that they cross each other in diagonal pattern. Tubular braided ropes have distinct advantages since they are more pliable, dry faster and are easier to handle. Their main drawbacks are difficulty in splicing and higher price.

