

ROPES

1. Ropes

- The term rope is used for all textile products **more than 25 mm diameter**.
- Ropes are obviously essential for both fishing vessels and fishing gear.
- They **provide the frame** through which the netting is converted into a fishing gear capable of fishing.

- Other functions of ropes in fishing gears are :
 - to **prevent the escape of fish** (cod line in trawl, purse line in purse seines),
 - **towing** (beach seines, Danish or-Scottish seine, trawls etc.),
 - to **shepherd and guide** the fish into the net (beach seines) and also
 - used as **warps** (small trawlers where hauling is done by hand).

2. Rope materials

- The most important raw materials used for ropes are:
 - (i) Vegetable fibres
 - (ii) Synthetic fibres
 - (iii) Metal wires
 - (iv) Combination of fibres and wires

2.1 Vegetable fibre ropes

- Until recently vegetable fibre ropes were commonly used.
- Only during the last two to three decades they have been gradually replaced by synthetic fibres.
- Although virtually all fisheries use predominantly synthetic fibres rope, vegetable ropes continue to be used in certain fisheries of undeveloped and developing countries.

- The following fibre ropes are common among the vegetable fibres:
 - Manila
 - Sisal
 - Coir

2.2 Synthetic fibre rope

- They are man made fibres which have been produced entirely chemical synthesis from simple basic substances.
- As compared to vegetable fibre ropes, they are of better uniformity and continuity, have high breaking strength are resistant against rotting.

- The synthetic ropes commonly used in fisheries are as follows:

- 2.2.1 Polyamide (PA)

- » continuous filaments

- » monofilaments

- 2.2.2 Polyester (PES)

- » continuous filaments

–2.2.3 Polypropylene (PP)

- » Continuous filaments
- » Monofilaments
- » Staple fibres made of monofilaments
- » Fibrillated film tapes

–2.2.4 Polyethylene (PE)

- » Monofilaments

–2.2.5 Polyvinyl alcohol (PVAA)

- » Staple fibres

–2.2.6 Polyvinyl chloride (PVC)

- » Staple fibres

2.3 Metal wires

- Steel wire ropes are very commonly used in fishing as warps and other lines.
- They are twice as strong as manila of the same weight and
- About eight times as strong as manila of same size.

2.4 Combination rope

- It is defined as a rope **with or without** a central core, consisting of **several strands** each of which itself is formed from a combination of natural fibres or synthetic fibre yarns and steel wires.
- Combination ropes are used as **framing ropes, sweep lines and legs of trawling gear.**
- Combination ropes are used **mostly in trawling.**
- They have:
 - **strength of steel wire,**
 - **easier to handle,**
 - **flexible and**
 - **less risk of injury to the user due to broken wires.**

3. Construction of fibre ropes

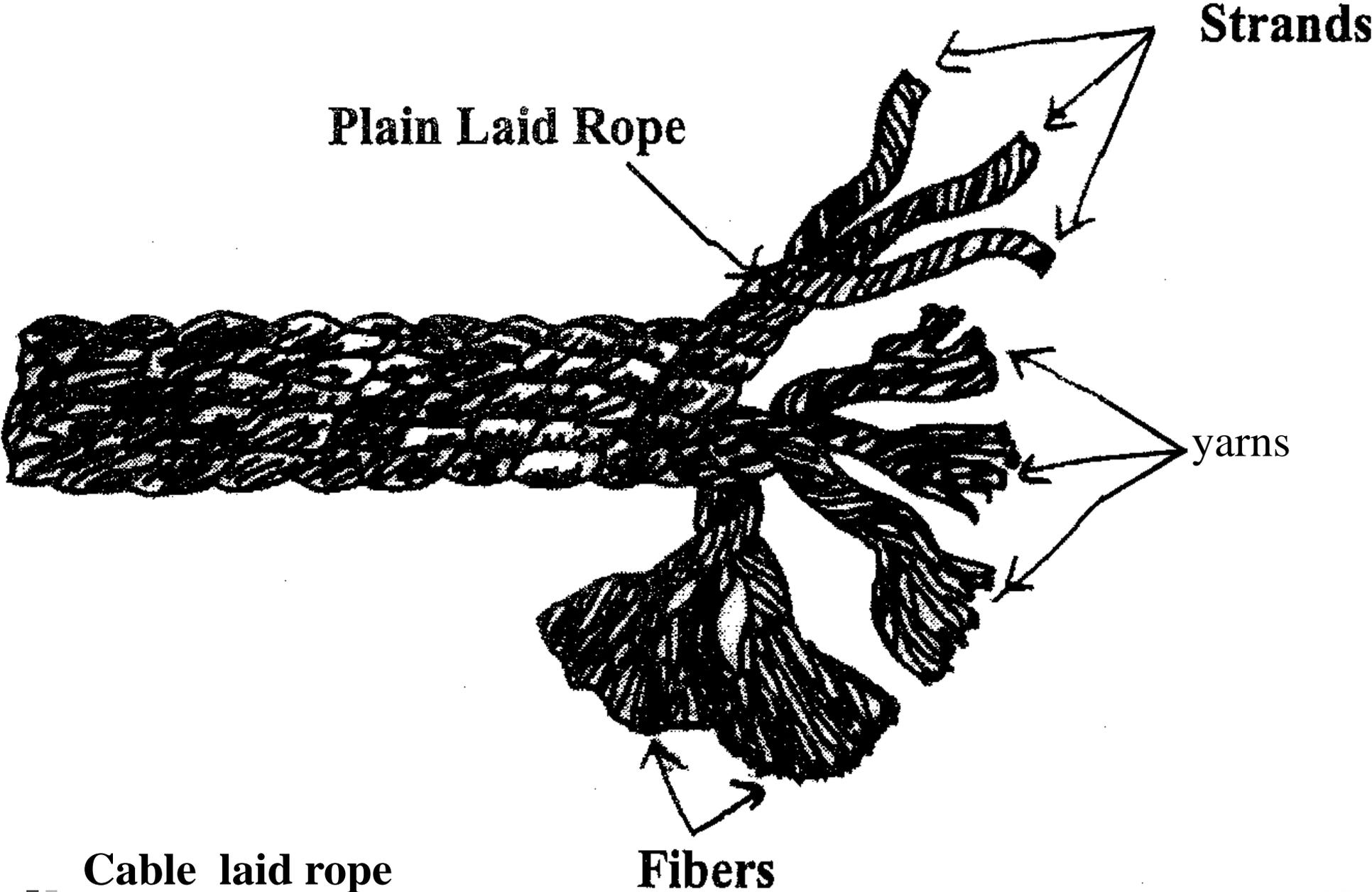
The laid ropes are constructed by the following steps: (Fig. 26)

1. **Fibres** are spun and twisted into **rope yarn** (rope yarn is a component of the strand of a rope. It may be a single yarn as in manila rope, a folded or a cabled yarn as in the nylon rope).
2. Two or more **rope yarns** are twisted into a **strand**. The **direction of twist is opposite** to that in the rope yarns. (Strand is one of the components of a rope obtained by joining and twisting or braiding together several rope yarns).

3. **Several strands**, mostly three or four are laid in a **rope**. The **direction of lay is opposite** to the direction of twist in the strands.

4. A cable laid rope is made by twisting three or more of laid ropes. The construction scheme of laid ropes and cable laid ropes is given in the figure1.

The construction of three laid ropes of manila and nylon ropes are given in the figure 2.



Cable laid rope

Fibers

yarns

Strands

Plain Laid Rope

Fig 1. Fibre rope construction

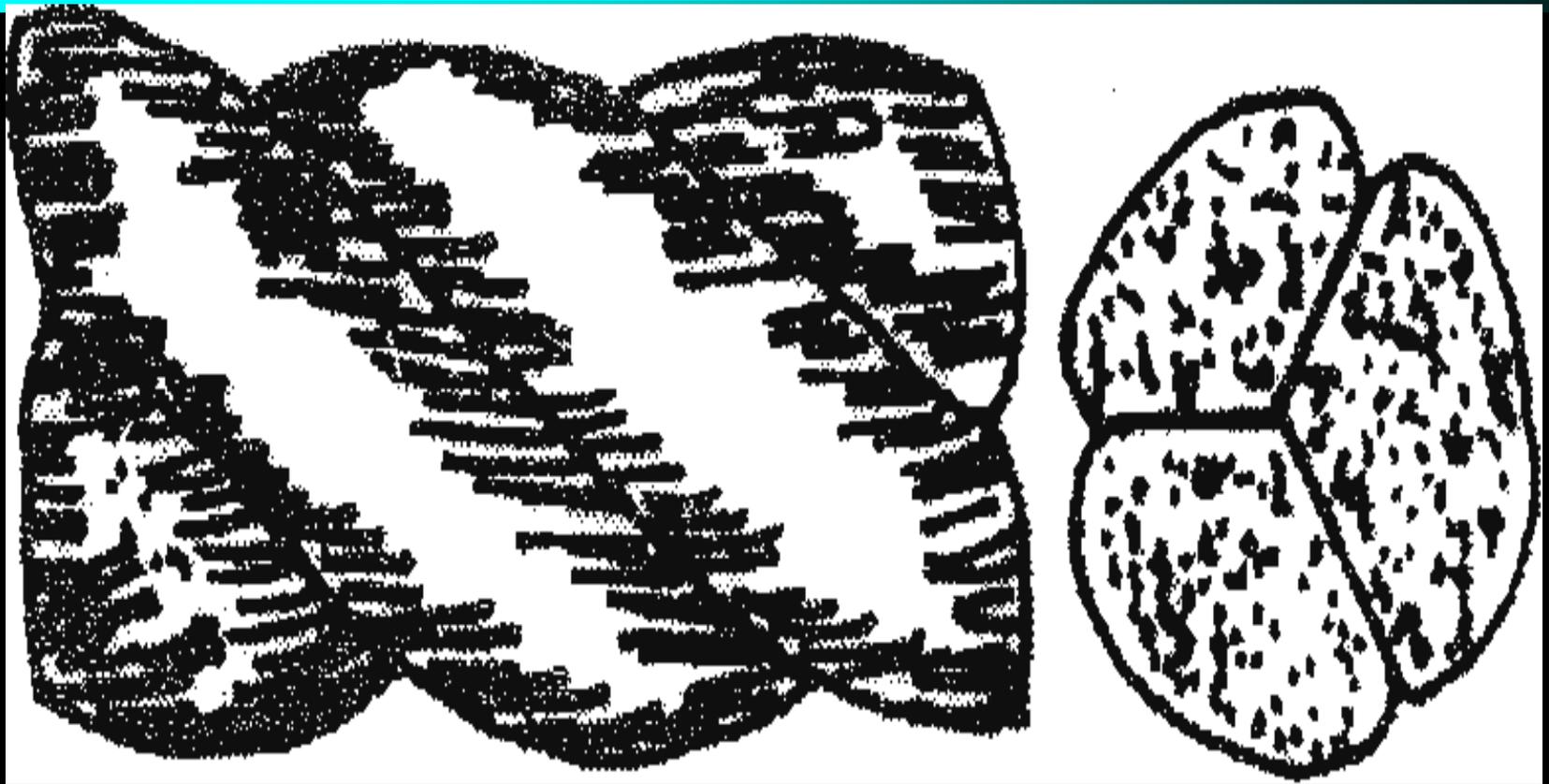
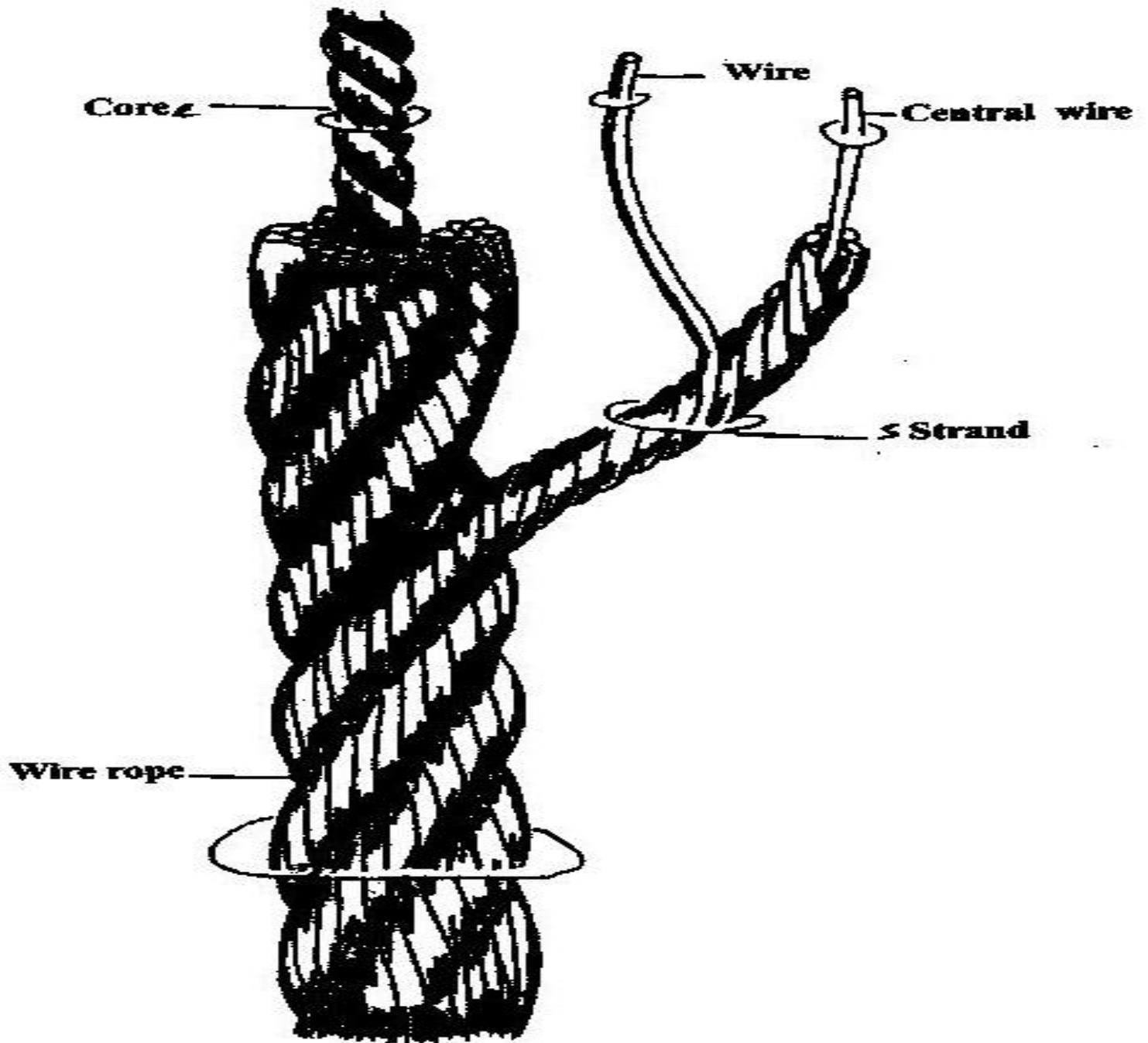


Fig 2. Three strand rope

4. Construction of metal wires rope

- The basic unit is a wire.
- A predetermined number of wires of proper size are fabricated in a uniform geometric arrangement of definite **pitch or lay** to form a strand of required diameter.
- The required number of strands are then laid together symmetrically **around a core** to form the rope.
- The core may be fibre, wire strand or independent wire rope.

Fig.
Parts
of
wire
rope



5. Construction of combination rope

- Combination of **natural fibres** and **steel wires** were used formerly.
- Due to **rotting nature** of natural fibres, they are now replaced by **synthetic fibre yarns**.
- **PP film fibres** or **PP monofilaments** are most commonly used due to simple manufacture, low elongation, low mass and comparatively low price.

- Combination ropes are **exclusively laid ropes**.
- Most common structures are **three** strands, **four** strands and **six** strands.
- Ropes with **four and more** strands always have a **core** in the centre of the rope.

6. *Size of ropes*

- It is specified by the **diameter or circumference** in millimeters.
- The steel wire ropes are often specified by the diameter while the fibre ropes by the circumference.

7. *Direction and degree of twist*

- The common direction of twist is the 'z' lay or right hand lay.
- Consequently the rope yarns have 'z' twist and the strands 'S' twist.
- The degree of twist of a rope is specified by the length of lay.
- One lay is one complete spiral turn of the strands.
- For example, in a three strand rope one lay is equal to three consecutive strands .

8. Identification

- The methods of identification of synthetic fibres are described under netting yarns (twine).
- The same methods hold good for the ropes also.
- The **simplest method** of identification of manila and sisal is **burning test**.

- Manila usually leaves dark grey ash, while the sisal ash is white.
- The coir rope can be identified by visual inspection of fibres which have a yellowish brown to reddish-brown color.