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IIT(BHU) ,VARANASI STUDENT'S NOTES

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Making of wire rope

- Patenting and normalizing: Heat treatment 950°C – 1050°C . Cooled in air or molten lead. Strain is removed and steel becomes homogeneous.
- Pickling: Dilute in acid solution. It removes impurities, such as stains, inorganic contaminants, rust or scale from ferrous metals, copper, and aluminum alloys. Washed in water and dipped in lime – neutralise the acid. Rods are baked at 150°C for 24 hours. It removes any hydrogen absorbed by the steel.
- Coating: steel is allowed to rust or copper sulphate solution. It acts as a lubricant when the rod is drawn through.
- Wire Drawing: it is drawn through a die of desired shape. The rod is pulled through the die, it induces a circumferential pressure which causes the plastic deformation of the metal and reduces the diameter of the rod slightly.
- The rod is passed through several dies successively and the desired diameter of rope is achieved. In this process the tensile strength of the rope increases.

Die- Tapered block of chilled iron or cast steel.

WIRE SHAPES

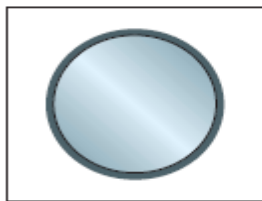


Figure 3: Round

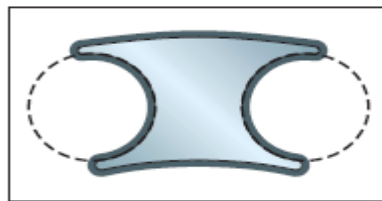


Figure 4: Half-lock

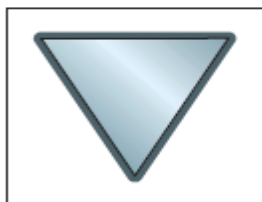


Figure 5: Triangular

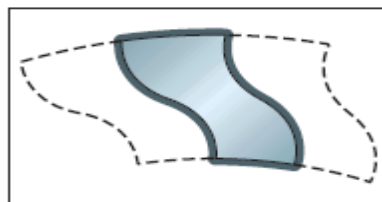
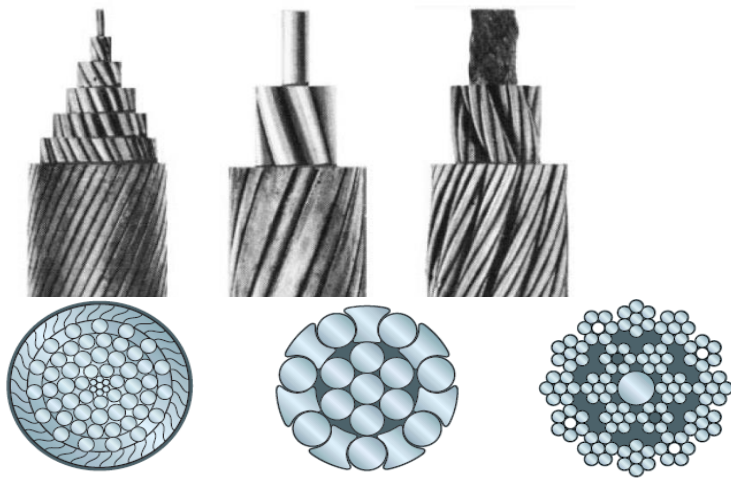
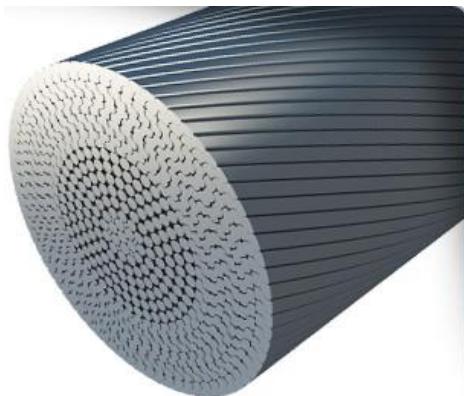


Figure 6: Full-lock



Full Locked Coil

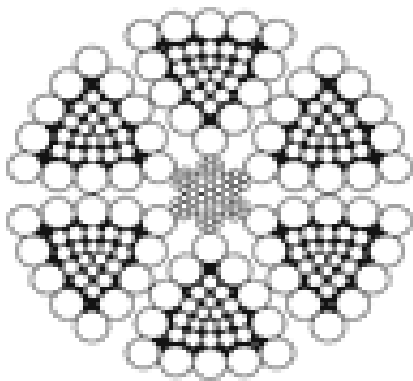
- The full locked coil strands are made by hot dip galvanised high strength steel wires.
- The strand is built by an inner core made by round wires and by one or more external layers of Z shaped wires.
- The Z shape of the wires is specially made to have a self-locking of the wires to obtain a compact section.



- Cover of helically spun full lock wires in several layers.
- Layers are spun in opposite directions
- Very high axial stiffness
- High breaking load due to 'z' shaped wires
- Even surface due to 'z' shaped wires
- Internal blocking compound
- Locked surface due to 'z' shaped wires

Flattened Strand

- Also called triangular strand, flattened strand ropes perform exceptionally well on certain installations, especially those involving heavy loads where the speed of operation is slow, where adequate diameter sheaves and drums are used, or where a crush resistant rope is required.
- Their distinguishing physical feature is their relatively flat exposed surfaces of strands. As a result, the rope exterior is more nearly a smooth, continuous circle than that of regular round strand wire rope. Flattened strand ropes are made with two layers of 12 wires around a triangular-shaped center.



- Crush-resistant
- More rope surface contact with sheaves
- More steel in cross section than standard round strand rope of equal size
- The flattened shape forms a bearing surface with more contact points on each strand than a round strand rope.
- With more sheave contact, weight and wear on the rope are distributed more uniformly than on a typical round strand rope.