

1.8 ACCESSORIES FOR LINEAR MEASUREMENTS

1. Ranging Rods

Rods which are used for ranging (i.e. the process of making a line straight) a line are known as ranging rods. Such rods are made of seasoned timber or seasoned bamboo. Sometimes GI pipes of 25 mm diameter are also used as ranging rods. They are generally circular in section, of 25 mm diameter and 2 m length. Sometimes wooden ranging rods are square in section. The rod is divided into equal parts of 20 cm each and the divisions are painted black and white or red and white alternately so that the rod is visible from a long distance. The lower end of the rod is pointed or provided with an iron shoe (Fig. 1.2).

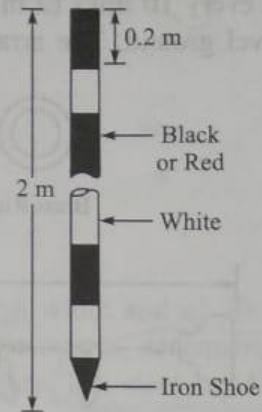


Fig. 1.2 Ranging Rod

2. Chains

A chain is prepared with 100 or 150 pieces of galvanised mild steel wire of 4 mm diameter. The ends of the pieces are bent to form loops. Then the pieces are connected together with the help of three oval rings, which make the chain flexible. Two brass handles are provided at the two ends of the chain. Tallies are provided at every 10 or 25 links for facility of counting. 'One link' means the distance between the centres of adjacent middle rings (Fig. 1.3).

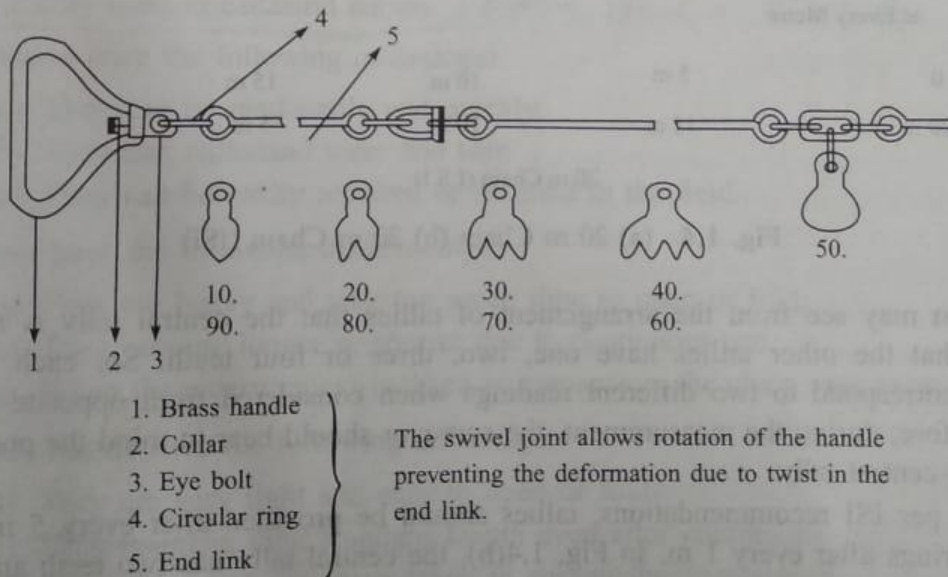


Fig. 1.3 Chain

The following are the different types of chains:

- Metric chain,
- Steel band,
- Engineers' chain,
- Gunter's chain, and
- Revenue chain.

Metric Chain Metric chains are available in lengths of 20 m and 30 m. The 20 m chain is divided into 100 links, each of 0.2 m. Tallies are provided at every 10 links (2 m). This chain is suitable for measuring distances along fairly level ground. The arrangement of tallies is shown in Fig. 1.4(a).

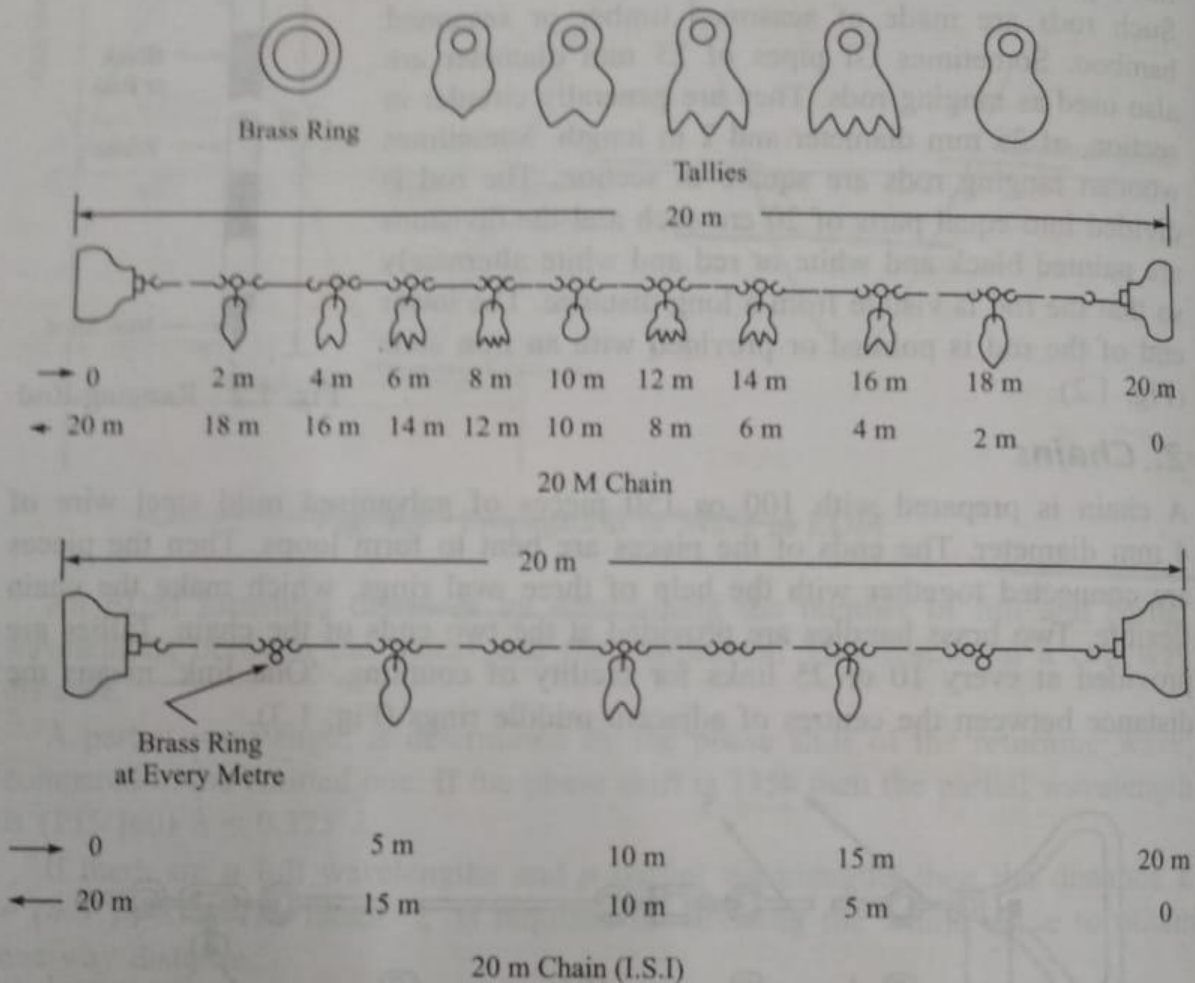


Fig. 1.4 (a) 20 m Chain (b) 20 m Chain (ISI)

You may see from the arrangement of tallies that the central tally is round and that the other tallies have one, two, three or four teeth. So, each tooth may correspond to two different readings when considered from opposite ends. Therefore, during the measurement, the surveyor should bear in mind the position of the central tally.

As per ISI recommendations, tallies should be provided after every 5 m and brass rings after every 1 m. In Fig. 1.4(b), the central tally has two teeth and the tallies on opposite sides of it have one tooth each.

The 30 m chain is divided into 150 links. So, each link is of 0.2 m. The tallies are provided after every 25 links (5 m). A round brass ring is fixed after every metre. This chain is heavy and is also suitable for measuring distances along fairly level ground. Here the central tally has three teeth (Fig. 1.5).

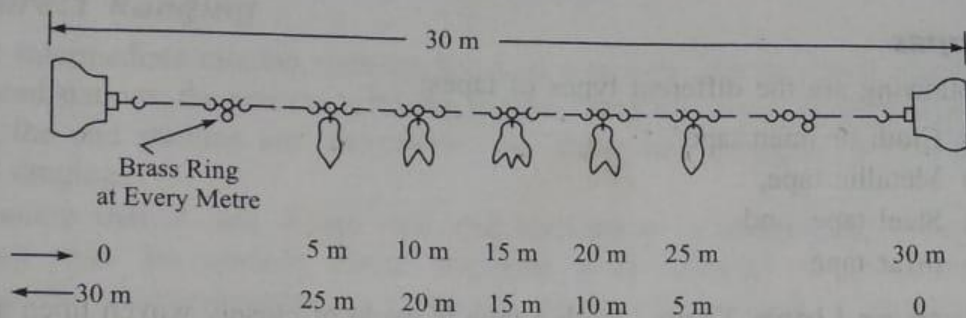


Fig. 1.5 30 m Chain

(b) Steel Band It consists of a ribbon of steel of 16 mm width and of 20 or 30 m length. It has a brass handle at each end. It is graduated in metres, decimetres, and centimetres on one side and has 0.2 m links on the other. The steel band is used in projects where more accuracy is required.

(c) Engineers' Chain The engineer's chain is 100 ft long and is divided into 100 links. So, each link is of 1 ft. Tallies are provided at every 10 links (10 ft), the central tally being round. Such chains were previously used for all engineering works.

(d) Gunter's Chain It is 66 ft long and divided into 100 links. So, each link is of 0.66 ft. It was previously used for measuring distances in miles and furlongs.

(e) Revenue Chain The revenue chain is 33 ft long and divided into 16 links. It is mainly used in cadastral survey. *each link = 2.06 ft*

Chains have the following *advantages*:

- They can be read easily and quickly.
- They can withstand wear and tear.
- They can be easily repaired or rectified in the field.

They have the following *disadvantages*:

- They are heavy and take too much time to open or fold.
- They become longer or shorter due to continuous use.
- When the measurement is taken in suspension, the chain sags excessively.

Steel bands have the following *advantages*:

- They are very light and easy to open or fold.
- They maintain their standard length even after continuous use.
- When the measurement is taken in suspension, they sag slightly.

They have the following *disadvantages*:

- If handled carelessly, they break easily.
- They cannot be repaired in the field.
- They cannot be read easily.