1.3 Ranging

The process if marking some intermediate points and a survey line join in two station in the field, so that the line between the two station is a straight line and the length between the station can be measured correctly, is called Ranging

The process of ranging can be done by two methods:

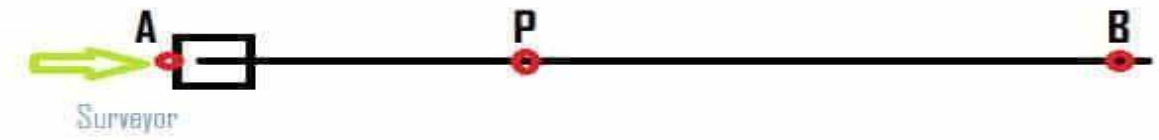
1. Direct Ranging
2. Indirect Ranging

1. Direct Ranging

Direct ranging is the ranging conducted when the intermediate points are intervisible. Direct ranging can be performed by eye or with the help of an eye instrument.

Ranging by Eye

As shown in figure-1 below, let A and B are the two intervisible points at the endsof the survey line. The surveyor stands with a ranging rod at the point A by keepingthe ranging rod at the point B. The ranging rod is held at about half meter length.



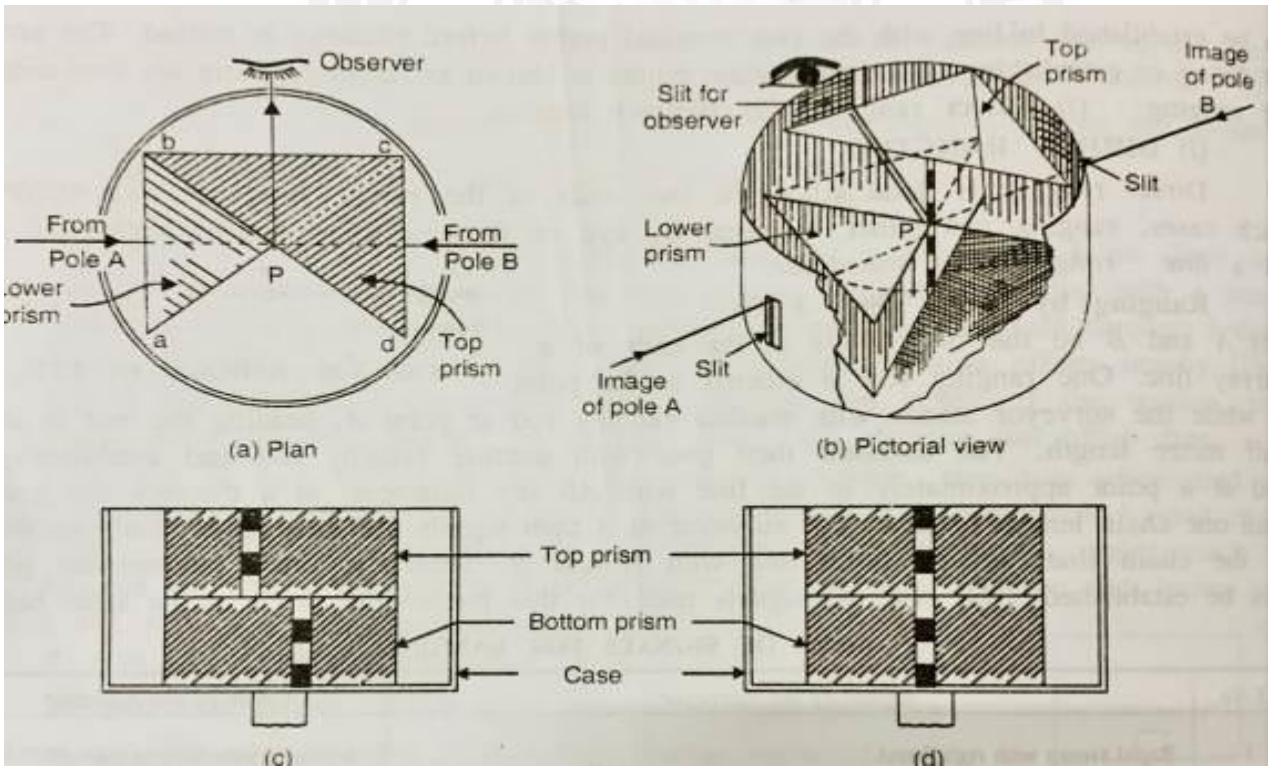
The assistant then takes the ranging rod and establishes at a point in between AB, almost in line with AB. This is fixed at a distance not greater than one chain length from point A.

The surveyor can give signals to the assistant to move traverse till the rod is in line with A and B. In this way, other intermediate points are determined.

Ranging by Line Ranger

The figure-2 below shows a line ranger that has either two plane mirror arrangement or In order to handle the instrument in hand a handle with hook is provided. The hook is to enable a plumb- bob to help transfer the point to the ground. two isosceles prisms that are placed one over the other. The diagonals of the prism are.

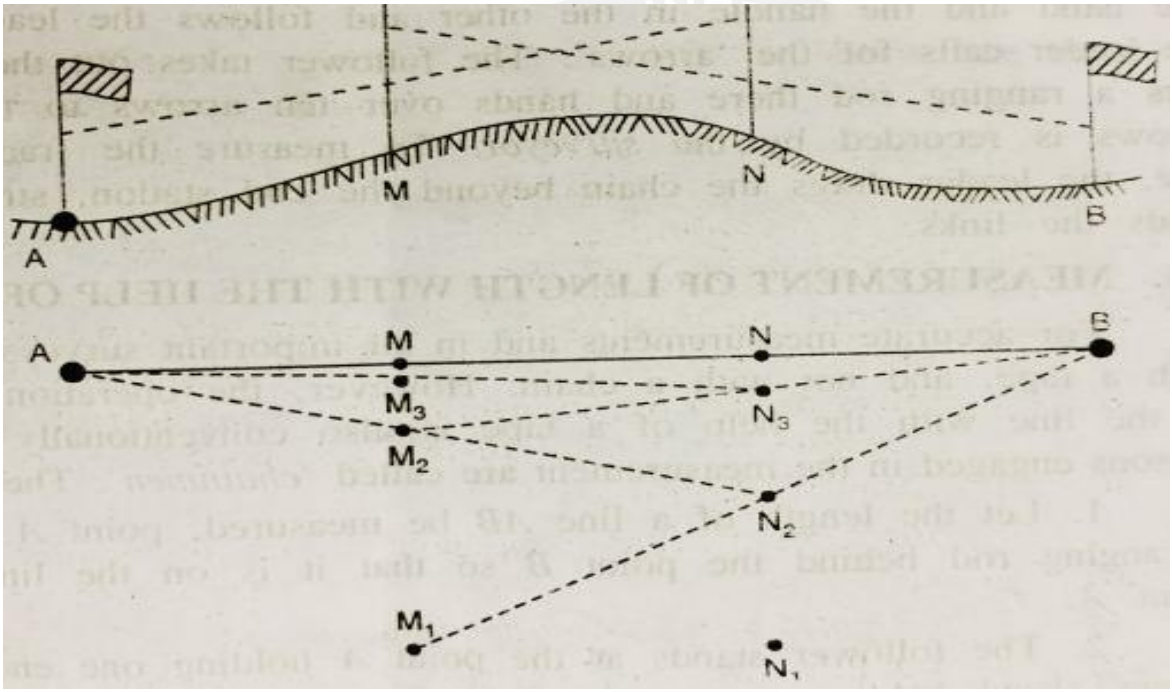
In order to range the point 'P', initially two rods are fixed at points A and B. By eye judgment, the surveyor holds the ranging rod at P almost in line with AB. The lower prism a b c receives the rays coming from A which is then reflected by the diagonal ac towards the observer. The upper prism d b c receives the rays from B which is then reflected by the diagonal b d towards the observer. Hence the observer can see the images of the ranging rods A and B, which might not be in the same vertical line as shown in figure-2(c).



The surveyor moves the instrument till the two images come in the same vertical line as shown in figure-2(d). With the help of a plumb bob, the point P is then transferred to the ground. This instrument can be used to locate the intermediate points without going to the other end of the survey line. This method only requires one person to hold the line ranger.

2. Indirect Ranging

Indirect ranging is employed when the two points are not intervisible or the two points are at a long distance. This may be due to some kind of intervention between the two points. In this case, the following procedure is followed. As shown in figure-3, two intermediate points are located M1 and N1 very near to chain line by judgment such that from M1, both N1 and B are visible & from N1 both M1 and A are visible.



At M1 and N1 two surveyors stay with ranging rods. The person standing at M1 directs the person at N1 to move to a new position N2 as shown in the figure. N2 must be inline with M1B.

Next, a person at N2 directs the person at M1 to move to a position M2 such that it is inline with N2A. Hence, the two persons are in points are M2 and N2.

The process is repeated until the points M and N are in the survey line AB. Finally, it reaches a situation where the person standing at M finds the person standing at N in line with NA and vice versa. Once M and N are fixed, other points are fixed by direct ranging.