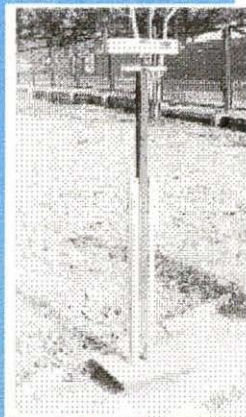




# CONSTRUCTION AND USE OF



## “A” FRAME

EXTENSION BULLETIN No. 79

**GUIDE ON THE CONSTRUCTION AND  
USE OF AN A-FRAME FOR THE LAYOUT  
OF FIELD SOIL CONSERVATION  
STRUCTURES**



**EXTENSION GUIDE No.....  
SOIL AND WATER CONSERVATIONS SERIES**

## **Introduction**

The Engineers' level has been the favourite instrument used for many years in the layout of soil conservation structures on the field, such as the setting out of contour lines for contour farming and strip cropping. Similarly, it has been used for setting out terraces on the field. Even though a high degree of accuracy can be attained with the use of this instrument, a practically acceptable level of accuracy can also be obtained by the use of simpler instruments that are far less sophisticated than the Engineer's level and which can be handled by virtually anybody on the field for the layout of the soil conservation structures that are to be set along the contours of the land. One of such instruments is called the A-frame. It is so called because its structure looks like the capital letter A. this simple instrument can be constructed locally by any carpenter, or welder.

## **Construction**

The A-frame can be constructed using wood or metal. It is desirable that it is made of a light material that will make its handling easy and non-cumbersome. So, if it is to be made of metal, then, light aluminum bars or pipes will be preferred. The following is the

procedure for its construction:

**Equipment Required:** (See figure 1)

1. 3 pieces of wood bars, two of them 5cm x 5cm (2in x 2in) and of 2.2m (7.2 ft) length each. The third is also 5cm x 5cm (2" x 2"), but 1.02m (3.4 ft) long.
2. Three sets of bolts, nuts and washers. The bolts should be about 0.51cm (0.20in) thick, 10.16cm (4in) long and the washers about 2.5cm (1in) in diameter.
3. Carpenter's level or a plumb bulb and string about 1.45m (4.9 ft) long.

**Fig. 1: Diagram showing the component parts of an A-frame**

### **Procedure for Construction:**

1. Make two holes on each of the two 1.83m (6.6 ft) long wooden bars. One metre from any of the two ends of the bar and this can be called point A and another at two metres from the same end and can be called point B.
2. Two holes exactly one metre apart are drilled on the third bar such that each is about 2cm (0.8") from each of the two ends of it.
3. One set of bolt, nut and washer is used to hold together the two long bars at the holes near the end of the bars (i.e. at point B).
4. The third bar is fixed on to the two long bars, at their point A, through the holes at its two ends (i.e. the two ends of the third bar) by means of the two sets of bolts, nuts and washes. The hole at one of its ends is used to hold on to the middle of one of the long bars through the hole at the middle of it (i.e. point A). The other ends of the third bar is then also held on to the middle of the other long bar through the hole at that point (i.e. point A).
5. The A-frame has now been constructed. (See plate 1). When it is held up, it should look like the capital letter A and the distance between the

two legs should be found to be 1.83m (6.6 ft), if all the holes had been drilled at the correct points. The next thing it to make a provision for holding a carpenter's level in position on the cross-bar. This can be done by fixing a small piece of wood 2cm x 2cm (0.8" x 0.8") and about 30cm (11.8") long on the 5cm x 5cm (2" x 2") cross-bar and another piece 2cm x 4cm (0.8" x 1.6") also about 30cm (11.8") long is fixed on the side such that the top of it is about 2cm (0.8") above the cross-bar. The carpenter's level can then be held in position between these two pieces. It should be noted that the surface on which the carpenter's level is to be placed should be completely level.

***Plate 1: An A-Frame***

6. Alternatively, a string and plumb bulb can be used in place of the carpenter's level. In which case, the string should hang from the point of connection of the two long bars, which is the

apex of the capital letter A. Also a vertical line must be inscribed on the cross-bar at midpoints between the two points at which it is connected to the legs of the capital letter A.

7. The A-frame should then be tested so as to make sure it is alright. So it is held vertically up on a level surface. If a carpenter's level is used then the bubbles should be at the middle within the two lines on the level indicator. If on the other hand, a plumb bulb is used, the string should hang vertically and be directly upon the vertical marking on the cross bar. If the bulb is not in the middle or the plumb bulb string does not coincide with the vertical marking on the cross-bar and the surface on which it is standing is purely level, then the measurements for the points of connection should be checked and necessary adjustment made.

Fig. 2: Diagram showing the labeled part of the A-frame.

### **Use of the A-Frame**

The A-frame as earlier mentioned can be used for the setting out of all soil conservation structures that are to be constructed along the contours of the land. Such structures include contour terraces and contour strip cropping in addition to the marking of contour lines on the field for contour farming.

### **Contour Lines Using the A-Frame**

If the A-frame is used, the following steps should be followed:

1. One of the legs of the A-frame is held at the upper part and at one of the ends of the field. The other leg is moved up or down the major slope until the bubble in the level indicates that the frame is level. A stake is then driven at



both points.

2. While the second leg is in position the first leg is swung to the other side with the second leg as a pivot. Again, the level position is determined using the carpenter's level and a stake driven at the new position of the first leg.
3. The second leg is swung to the other side with the first leg (at its new position) as the pivot. Again the second leg is moved up or down the slope until the frame is level. A stake is driven at the new position of the second leg. This process is continued, until the end of the field is reached. The line connecting the stakes becomes a contour line.
4. If the spacing of the contour lines is determined, (say X metres) then a point down the slope of the land at a distance equal to the spacing, from the initial point is marked. The new line is marked out using the procedure indicated below.

**Fig. 3: Diagram showing points connecting contour lines**