GUIDE TO THE CONSTRUCTION OF CONTOUR LINES FOR CONTOUR FARMING USING SIMPLE INSTRUMENTS

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Introduction

On the surface of any land there are always points of equal elevations. A line through such points usually cuts across the visible slope of the land and is known as contour line. When farming operations, particularly ridging is carried out along the lines or contours of the land, the entire activity is referred to as contour farming.

Purpose

The main purpose of such a practice is to minimise or even eliminate the effect of destructively steep slopes such that rain-water falling on the land surface is not allowed to run along its slope. This way, high erosive velocities can be avoided and the soil conserved. Runoffs can also be minimised or even eliminated, forcing the water to eventually infiltrate into the soil thus, again the water is conserved. In short contour farming can conserve both soil and water.

Advantages

Through the conservation of soil and water, crop yields are significantly increased. In addition, fuel and other operation efficiencies are greatly improved by the very practice of farming across the slopes.

Planning the Contour Lines

Ideally, planning the lay-out of contour lines on the field can best be done after a topographic survey.
has been conducted and the contour map of the land has been produced. If the contour lines on the map are fairly parallel, the land is said to be uniform. In such a case, one contour line marked out on the field is enough to guide all the tillage operations. Where the contour lines on the map show non-parallel lines, it is an indication of irregularity of the slope, in which case, several lines have to be laid out along the contours of the land.

Nevertheless, in field practice, it is sometime good enough to determine the nature of the land slope by merely looking at the topography. Whenever the slope is observed to be uniform, one guiding or “Key” contour line may be enough. Otherwise, a number of them have to be constructed at intervals that can adequately take care of the apparent change in the topography.

**Field Layout:**

Contour lines may be laid out using different instruments. One of the most accurate methods is to use the Engineer’s level. (See plate 1).
With such a level, the following steps can be followed for the lay-out:

1. Set-up the instrument at the middle of the field from where you can comfortably sight the two ends of the field. It will also need to be set-up at a point a little below where you expect the first contour line to pass through. So the choice of the position will be by observation (See Figure 1).
2. Choose a point at the high side of the land and at one of the two ends of the field. Let some one hold the staff where you can read it. A stake is driven at that point. (Again see figure 1).

3. Ask the man holding the staff to walk about 33 steps across the main slope of the field. (It doesn’t matter how big or how small his steps are). He stops and moves up and down the major slope in accordance with your signals. He holds the staff on the ground, while doing this. Whenever he puts it at the point that gives same reading as before, you ask him to put a stake there. (See figure 2).

Fig. 1 Diagram of field with level instruments showing the starting of the first point.
Fig. 2 Diagram of field showing the completion of 1st and 2nd points.

4. He moves another 33 steps across the slope, the same thing just mentioned (in step 3) is repeated. The exercise continues until the end of the field. The line through the stakes forms the first contour line. This line can, then, first be scratched on the ground with a stick, and then with a plough. Subsequent lines can similarly be so laid out. (See figure 3).

5. The spacing between contour lines is deter-
mined by both slope and soil type. Table one provides a guide to that.

**Fig. 3 Diagram showing the first contour line across the field.**

**Contour Line Using a Home-made Level:**

Contour lines using a home-made level can be laid out by going through the following steps. (See Plate 2).
Plate 2: here

1. Put your level at the top part of the field and at one end of it.

2. Set your target at a point equal to the height of your instrument (which is fixed all the time). (See figure 4).

3. Let the target man place his target 33 steps across the slope, from the end of the field. He is signaled to move up or down the major slope of the land until the set point on the target is sighted through the level. A stake is driven at that point.
Fig. 4: Diagram of field with home-made level showing the starting of the first point.

4. The target man walks 33 steps further across the slope and stops while the level man walks to his position (i.e. where the first stake was fixed). From there, the level man signals him to move up or down the slope until he reads the fixed height on the target. A stake is then driven at that point again. (See figure 5). This process will continue until the end of the field is reached.
5. Contour line is then drawn through the fixed stakes, followed by a plough marking on the field, as shown in Figure 6.

Fig. 5: Diagram of field showing the completion of 1st and 2nd points.
Fig. 6: Diagram showing the first contour line across the field.
Contour Lines Using the A-Frame: (See Plate 3)

Plate 3 here

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. (See figure 7).
Fig. 7: Diagram of field with A-level showing the starting of the first point.

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 and a stake driven at the new position of the first leg. (See Fig. 8).
Fig. 8: Diagram of field showing the completion of 1st and 2nd points.

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 reach. (See figure 9).
Fig. 9: Diagram showing the first contour line across the field.

Contour Lines Using A Line Level

One of the simplest, though not the most accurate, methods of staking out the contour line on the field is by the use of a line level which consists of two straight poles and a rope.
The rope can be as long as it can be possible to pull it tight. Usually, the shorter the rope the tighter it can be pulled. It is, however, recommended that the rope be of definite reasonable length, say 3 meters or 10ft. This will make it useful for other purposes as well. The following steps are followed for the establishment of the contour line on the field:
1. Tie the two ends of the rope each to one of the poles at exactly the same distance from the ground.

2. Put one of the poles (which we shall call pole No. 1) at the top part of the field and at one end of it.

3. Move the other pole (pole No. 2) towards the other end of the field across the slope of the land, as far as the length of the rope will allow. (See Figure 10).

Figure 10 Diagram of field with a line-level showing the starting of the first point.
Then move the pole on the ground up and down the landslope until a position is hit where the rope is found to be level when a carpenter’s level is placed on top of it. Drive a stake at that position and keep the pole firmly in position. (See Figure 11).

Fig. 11 Diagram of field showing the completion of 1st and 2nd points.
4. The man holding the pole No. 1 now moves across the slope of the land towards the other end of the field, past the man holding pole No. 2, to as far a point as the rope will allow. He then moves up or down the slope just like his colleague did, until the rope is level. He drives a stake at that point and holds firmly the pole in position, while his other colleague moves.

This process is continued up to the end of the field. The set of stakes now form the contour line, which can be marked with a plough line as shown in figure 12.

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**Fig. 12:** Diagram showing the first contour line across the field.
Conclusion

It is very important to note that the judgement of the person planning the contour farming as to the number of contour guide or Key Lines to be marked on the field and intervals between them is essential to the ultimate success of the whole exercise. Where the land can be seen to have an obviously uniform slope there is no problem in whatever number is marked out, since as earlier indicated, in very uniform slopes one contour guide line may be enough. However, where there is the slightest sign of a change in slope another line must be marked out. Alternatively, a general rule of thumb is given of 7.62m to 15.24m (25ft to 50ft) spacing of the contour lines, depending upon the apparent change in topography, that will ensure the adjustment of the farming operations to follow the contour. Once farming is observed along the contours, strictly, the desired efficiency of operation and more importantly, soil conservation shall be achieved.