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Soil conservation: build contour banks with a disc plough

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Heavy earthmoving machinery is not necessary for contouring; most farmers are already equipped to do the job themselves. This article by soil conservation advisers G. W. Spencer and D. J. Carder tells how to . . .

build contour banks with a disc plough

FOR building contour banks, any type of disc plough is suitable, including the large single-disc models, provided the discs are large and in good condition. A plough that will not make a good job of ploughing will not build a bank easily and economically.

For successful bank building the soil must be in good ploughing condition. The old fallowing time is a suitable as well as a convenient one; another suitable time is immediately after the first winter rain. To obtain good weed control in crops it is desirable to delay the first ploughing for a few days after the opening rains until most of the weeds have germinated. The soil is in good condition for ploughing during this period, which is, therefore, ideal for bank building. As it has to be moved several times, soil that is too dry soon becomes very powdery and difficult to handle. Even with good conditions the time and number of runs needed to build a bank will vary.

A useful modification, if much bank building is to be done, is to use oversize discs in the front. The front disc is replaced by an oversize one, say a 24-inch, in place of the standard 22-inch disc. In twin-disc ploughs the original front disc can then replace the second disc. This will give an arrangement of (reading from the front) 24-inch and 22-inch, 22-inch and 20-inch, 22-inch and 20-inch, etc.

During bank construction soil is moved from a strip of four plough-widths on to the line surveyed for the bank. The soil is cultivated for two plough-widths on each side of the surveyed line. The system of building is a “round and round” one, moving soil from the outside on to the surveyed line on which the bank is actually built. Most of the soil for the bank is gained from the top or channel side.

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Fig. 1.
CROSS SECTION SHOWING POSITION OF MARKING RUNS
The first marking run should follow the line of survey pegs accurately
Marking Runs

The plough should be set for normal depth of ploughing.

For the first marking run it is most important to follow the survey pegs accurately. On this run a smoothly curving line joining all the survey peg positions is wanted.

**TOP SIDE**

**First run**

close to, and throwing soil down to, the surveyed line. This run is usually done at time of surveying.

**Second run**

a plough width further out from the surveyed line—the front discs throwing soil into the furrow left by the previous run.

**BOTTOM SIDE**

**First return run**

return close to and on the downhill side of the surveyed line.

**Second run**

Another full plough width as in normal ploughing—OR if it seems there will be too much soil, only half a width extra. With large ploughs the half width is sufficient.

Fig. 2.

THE FIRST THREE MARKING RUNS

A. First run, top side, accurately follows the pegged line
B. First run, bottom side
C. Second run, top side

The dotted line shows the position of the surveyed contour line
Building Runs

The plough should be closed up to throw the soil better. The front discs are set deep and the rear discs are set to cut shallow. The rear discs need not cut much fresh soil; their main function is to clean out the channel.

**TOP SIDE**

Third run
	nearly on the same track as the second run, but moved in (downhill) the width of the furrow.

**BOTTOM SIDE**

Third run

on the same track as the second (outside) run, or moved in (uphill) slightly.

Fig. 3.

**FOURTH RUN, TOP SIDE**

This is the second actual soil moving run and is slightly inside the track of the third run. Tape outlines the growing mound of soil.

Fourth and later runs

are each one furrow width nearer the surveyed line. The original furrow, on the outside uphill edge of the worked strip, is progressively widened to form a broad, flat channel.

When the rear wheels of the plough drop from undisturbed ground down into the channel, the rear discs may have to be raised a little.

With each run the tractor and plough are working further up on the growing mound of soil. This weight of machines helps to make a well-consolidated bank.

Fourth and later runs

should aim to shape and consolidate the lower side of the bank. As less work is needed here, the lower side is usually completed first and has a steep slope from the top of the bank to ground level.

Normally each of these runs would be progressively nearer the surveyed line, but if a more gentle slope is wanted, the last few runs can be made a little further down the slope. This should not be necessary if the working on the lower side was the full two normal plough widths at the beginning.
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The Completed Bank

After about eight or nine runs a bank 18 in. to 21 in. high with a flat channel 8 ft. to 10 ft. wide should result. If the bank is too small, obtain extra soil by a further series of runs from the outer limits of the worked area.

The uphill face of the bank should be slightly dished or straight, as shown (Fig. 5). If this face is humped or the bank remains as two windrows, or there is loose soil in the channel, extra runs are needed on the top side. Two or three fast runs should be made along the channel and on the face of the bank. Oversize front discs will reduce the need for these additional runs.

The bank should have the uphill face straight, or slightly dished. This cross section ensures that there is no deep flow of water against the bank.
Points worth keeping in mind are:

1. Soil is most easily obtained from the uphill side.
2. Try to strike a balance between moving too little soil and trying to move too much with each run. Repeated half-effective runs will break down the structure of the soil and make it hard to handle.
3. Uniform cuts are needed, especially on curves, to ensure a bank of uniform height.

Bank Endings

Hydraulic or other quick lifts naturally make the work quicker and easier and the bank can be built exactly as surveyed.

At the non-discharge end:

A block or high spot is needed to prevent water discharging from the wrong end of the bank.

The block is made by surveying the end peg 4 to 6 inches higher than the next. The bank must be built right up to that peg. This means surveying the end peg where the machine can build to it and turn easily. If the peg is placed against a fence the machine, in turning short, would fail to build the block.

At the discharge end:

The water should never discharge
- on to ground used for cultivation
- directly into a gully.

The bank ending should
- not restrict or block the flow of water, otherwise the water may be ponded enough to flow over the bank.
- not allow any water to flow back along the depression on the lower side of a freshly built bank and on to cultivated soil.

The success of a contour bank system depends almost entirely on the safe disposal of any excess water. This means that nothing must be left to chance at the waterway or discharge end of a bank.
As the waterways themselves often present a problem, special care must be given to the details of construction at the discharge end. A good plant cover below the discharge point is essential to carry a flow of water safely. Furrows, ruts or loose soil will lead to serious erosion which could endanger the whole system. The discharge point of a bank should have been carefully chosen during surveying. It is most important to build the bank so that it will discharge exactly at this point.

**Method A:**
(For either hydraulic or manual lift ploughs).

The best method is to stop, lift the discs out of the ground, make the turn uphill and let the machine into the ground when in position on the lower side of the bank. This position is with the rear of the plough at the end peg. This means that the depression on the lower side does not extend as far as the channel of the bank and cannot carry water back on to cultivated ground.

**Method B:**
(For manual lift ploughs, if a dozer blade is available).

The usual "figure of eight" turn is made tightly about a chain short of the bank ending. When the ploughing is finished, the ground where the turns have been made can be smoothed out and the last chain of the bank built with the blade. By this method the discharge point of the bank can be built exactly to the end peg. Care should be taken that the plough-built and dozer-built sections join with no change in the gradient along the channel.

**Strengthening Weak Spots**

A contour bank is no better than its weakest section, so extra work is required on sharp curves, and where banks cross depressions or filled gullies.

When building the banks these weak spots must be built up with a dozer, a scoop, or, if necessary, by hand. The extra soil for this can usually be obtained from below the bank after the main building runs with the plough have been completed.
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