A practical guide to building contour banks with a road grader

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Building contour banks with a road grader

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THOUSANDS of miles of contour banks have been built in Western Australia, and most of this earthmoving has been done by tractor and disc plough* or by road grader. This article describes the technique recommended for bank construction with the road grader.

The more powerful (100 horse power or more) road graders of the tandem drive or four wheel drive type are the most suitable. A good deal of power is needed to cut the earth in forming the channel, and to grade and compact it into a bank.

Four runs are normally needed to build a bank and form a channel of good capacity on the uphill side of the bank.

BLADE SETTING:

With hard soil conditions however, five or more runs are often required. Even under ideal conditions four runs are still recommended as there are likely to be some weaker sections which need reinforcing. All the runs are made on the uphill side of the surveyed line.

The blade settings used for normal road work are not the best for bank construction. A better setting is shown below.

*The technique of contour bank construction with a disc plough was described in an article in the March-April, 1956, issue of this journal. This is available as Bulletin No. 2335.
The picture series on these two pages shows the recommended method of bank building using the standard four runs:

**FIRST RUN:**

The first run forms a windrow of soil on the survey line. The blade is set in an upright position and at a sharp angle to the line of travel. Both toe and heel of the blade should cut to an even depth of 3 or 4 inches.

**SECOND RUN:**

The second run straddles the uphill side of the first blade cut. The toe of the blade is set to cut the soil to a depth of one or two inches and the heel of the blade digs as deeply as possible. This gives a cut which is tapered from just below ground surface on the uphill edge, to the final depth of the channel on the lower edge. The windrow of soil is near the centre of the first blade cut.
THIRD RUN:

The third run straddles the second windrow and grades the soil across to the first windrow on the surveyed bank line. The blade is set to scrape a flat channel and cut slightly deeper than the first cut. The upright setting of the blade can be clearly seen in this view.

FOURTH RUN:

The fourth run is on much the same track as the first and third, but cuts 3 or 4 inches deeper than the first cut. The blade is set to leave a flat channel. The final cross section is a gentle taper from the uphill side to a small step (of 3 or 4 inches) into a wide flat channel. The bank should be at least 18 inches high and 5 or 6 feet wide at the base.
BANK CAPACITY

The capacity of a bank refers to the amount of water which can be held in the channel. The cross-sectional area of the channel gives a measure of the bank capacity (shown by the shaded area in the diagram below.)

A channel with 10 square feet cross section (10 feet wide by 1 foot deep), will hold more than 4,000 gallons for each chain of length. Three miles of this bank would hold a million gallons.

In good conditions a grader can construct a mile of bank in two hours. At a rate of, say, £5 an hour three miles of bank will cost £30—not a great outlay to control a million gallons of rainfall. Some shires make road graders available for soil conservation work at special rates as they realise that every million gallons of water kept on the farm is that much less for the road system to handle.

SOIL PREPARATION FOR BANK BUILDING

In moist soil no preparation is required. In clay soils when the soil is soft enough for cutting it may be too sticky for efficient grading. A deep scarifying along the bank line will break up the soil. If the loose soil is allowed to dry for a day or two it will then be suitable for grading.

Much bank building is done in late summer because graders are then more readily available than in the winter months.
when road work must have priority. To get best results in summer some soil preparation should be carried out. The contour lines should be surveyed during the previous winter. A strip 12 to 15 feet wide above the surveyed line is cultivated to a depth of 6 inches. In soils likely to set hard, a second cultivation can be done in spring to shatter the clods before they dry out.

With the loosened soil in the fallow strip (along the surveyed line), a satisfactory bank can be made at any time during the summer. It is safest however, to wait until late summer or autumn, to reduce the risk of damage by summer storms, as banks built with dry soil will not be well compacted. The lands between the banks should be cultivated on the contour as soon as possible after the first rains, to promote greater absorption and reduce run-off.

**SOME PRACTICAL HINTS**

**Bank Lines Marked with Pegs**

If the surveyed line is only pegged but not marked the grader makes the first run so that the windrow of soil is placed along the line of pegs.

**Bank Lines Marked by a Run with a Plough or Scarifier**

Banks to be built with a grader should always be marked out by a cultivation run on the uphill side only of the surveyed line. The bank is built on the downhill edge of the cultivated strip.

**Bank Endings**

The last pegs at both ends of the banks are often on carefully selected spots. The bank should be constructed exactly to these points and not turned up or downhill. If the line has been marked with plough or scarifier, wooden or steel pegs should be used to mark the position of the end survey pegs.

**Gully Filling**

Any gullies which cross the bank lines should be filled in (by plough, grader or bulldozer) before the banks are built. Extra soil should be pushed on to the places where banks cross the filled gullies. After the banks are built extra soil should be pushed up (by spade if necessary) at the gully crossings to allow for sinkage and to make sure the bank cannot break at these points.

**Road Crossing Over Banks**

These should be avoided, if possible. If they are necessary extra soil must be pushed on to the downhill side of the bank to make a long tail, and the crossing shaped so that vehicles can cross over. The height of the bank and the capacity of the channel must be maintained.
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