Soil conservation: contour banks must be maintained

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Contour Banks Must Be Maintained

The wet winter of 1963 showed up faults in many contour bank systems and emphasised that banks won't last forever without maintenance. This article tells where to look for weaknesses and how to treat them.

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The maintenance of contour banks is vital. It should be regarded as part of the programme for the cropping year, and at other times when damage has occurred. There is no magic about contouring. Banks are meant to withstand and control flows of water and must be made, and kept, big enough for this.

A contour bank should have an effective channel capacity of 10 sq. ft., say 10 ft. wide and one foot deep or about 6 1/2 ft. wide and 18 inches deep. It is normally better to have the wider channel with less depth (10 ft. by 1 ft.) provided the bottom of the channel is horizontal. When newly constructed or freshly maintained a bank should be 18 to 20 inches higher than the bottom of the channel. A bank and channel of this size and cross section is easily and readily maintained with either a plough or large earth-moving equipment such as a road grader.

The recommended sizes and spacings are based on the understanding that it is almost impossible to build banks which will never need repair. In addition, it is neither practical nor economic to design a system which would deal completely with the worst storm that would occur only once in, say, 25 years.

This means then that bank maintenance should be regarded as part of the normal farm programme, and that some storm damage, calling for repair work should be expected, perhaps every five or seven years.

When building banks with sharp bends it is hard for the machine to maintain the height of the bank and avoid "cutting the corners." Unless great care has been exercised and the levels checked during construction, these bends may show up as weaknesses as the banks settle down. They form low spots in the hollows and high spots on the ridges. For these troubles the dozer blade is the most suitable.

Another in-built weakness may occur where different types of earthmoving are joined, or where banks have been joined.
This contour bank was built by tractor and disc plough at a field day. The good size bank and broad flat channel will control run-off water. Occasional maintenance is necessary to restore the height of the bank. Any weakness or damage should be repaired immediately.

through fences. In addition to reinforcing the bank at a fence crossing, such places need special attention to ensure enough channel capacity. After rain these places should be inspected and straw and other rubbish cleared from posts and wires—otherwise the channel may become blocked.

Weaknesses and low spots often occur where banks are built across old gullies. The gully filling may settle quite a lot after the banks are built. These become danger points even though they were reinforced during construction.

Proper crossings are needed where banks are taken across farm roads. After several years' use these road crossings can easily become lower than the rest of the bank and water can overtop them. Places such
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as these should be built up and maintained regularly.

Damage by stock seems inevitable, mainly in the early life of a bank, but lessens with well-maintained banks as they consolidate. This type of damage is easily repaired with normal farm machinery if attended to promptly.

**Dealing with High Spots**

At high spots the channel can be deepened with a blade to allow water to flow freely to the outlet end. The whole width of the channel should be deepened and care taken that it is level in cross-section to give it full capacity.

If necessary the whole section of bank at the high spot can be pushed downhill. The new position should be ripped in advance to provide bonding, and the replaced bank well built up, compacted, and the levels along its channel checked.

**Dealing with Low Spots**

Extra soil should be pushed with a blade on to low spots in the bank, mainly from the bottom side. This can be done with a farm dozer with a high lift, or a road grader or even a shovel. In the case of a bank crossing an old gully, extra soil can sometimes be obtained from the shoulders of the gully on the top side of the bank.

The reinforcement should be carried well to the flanks of the original low spot, especially towards the outlet end of the bank. The loose soil should be consolidated with the wheels of the machine. This compacting will often show that more material is needed to obtain a safe height of consolidated bank.

The presence of low spots can be detected by eye, and their proper strengthening roughly checked. By walking down the slope until the bank is at eye-level, it can be seen as a straight line. Low spots show up as dips in the line and, when reinforced should stand out as humps in the line. It is best, however, to rely on the hose level for detailed checking.

**Uniform Channel Capacity**

Regardless of the size of the bank it is important that the channel has a uniform capacity for the full length of the bank. This is particularly necessary at weak places such as gully crossings, ridges and hollows. Very often these weak spots would not become danger spots if a channel of uniform capacity was obtained.

The problem of the plough tending to cut corners when crossing hollows and ridges is recognised and can often be overcome only by using the dozer blade to make the channel the correct size.

A storm in this cultivated paddock caused some wash between banks and silting in the channel. The silt should be cleaned out to restore the channel to its original capacity, otherwise the silt fan will restrict the flow of water (as in the photo) and could cause it to overflow the bank.
The hole in this contour bank was caused by subsidence of an old rabbit warren. The hole should be filled and compacted, and this danger spot inspected after subsequent rains in case of further trouble.

When using the road grader for building or maintaining banks the effective width of the blade is decreased when turning sharp bends on ridges. An extra run or two for a few chains along this high spot would help to obtain a channel of the required capacity.

**General Bank Maintenance**

Maintenance is needed when bank height is reduced either by settling or trampling by stock. Channel capacity may also be reduced by silting. Maintenance is always important and when done promptly is fairly easy. One or two runs can be made with a road grader, though probably a more satisfactory machine is the disc plough. Maintenance with the plough becomes virtually part of the normal cultivation programme. A couple of fast runs can be made along both sides of the bank, with the discs set to throw as much soil as possible. All banks can be built up in this way before the paddock is cultivated.

Dozer-built absorption banks may need cleaning out if silt washes into them from above. The method is by straight pushes downhill the same as used when first building the banks. The channel blocks should be replaced to half the bank height.

**Repairing Breaks in Contour Banks**

Water discharging through a break in a bank can cause serious gullying and also will overload the bank below. The break should be repaired as soon as possible. Breaks which occur during summer storms should be repaired immediately with the most suitable equipment available. During the winter the repair can be more difficult if boggy conditions prevent the use of proper equipment. Small breaks can be filled with a spade—a small amount of spadework if done in time can often prevent more serious damage. With larger breaks, it could be difficult to make a compacted repair with wet soil, and the use of sandbags may be necessary as a first step to plug the gap.

If soil conditions are not too boggy, larger breaks can be filled by bulldozer blade or by tractor and scoop. Compaction of the earth fill is important, particularly where a gully is washed through the break. Extra reinforcing should be done to allow for settling and to make sure the bank will not break again at this point.

**Repair and Maintenance of Discharge Ends**

It is important, if the discharge end of a grade bank is damaged, that the cause should be checked and a prompt remedy found. Otherwise damage may spread in the waterway or along the channel of the bank and be extremely difficult to repair. Water may break through the bank some yards before the end. It can easily be seen if this is due to excessive plant growth causing a blockage. It is more likely to be caused during construction by tapering off the bank, so reducing its capacity at the end, or by actually turning up the end.
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This scour began after a scarifier was dragged around the discharge end of the contour bank. Attention is necessary to prevent the gully eating back along the channel. Filling the scour with topsoil, and protecting it with wire netting and straw or with jute mesh will aid the regrassing of the discharge point.

The fall along the bottom of the channel should be carefully checked with a level at intervals of about 10 feet. There should be a continuous fall of about 1/2 inch in each 10 ft. from the bottom of the channel on to the surface of the waterway. If there is a reverse gradient, that is a hump in the channel, it must be moved by a blade and the breach in the bank filled and well compacted. If necessary, the whole end section of the bank can be pushed downhill to its correct level as described in “Dealing with High Spots.”

While repairing the bank outlet, it is most important not to disturb or destroy the cover of the waterway by wheel ruts or furrows. If erosion is caused in the waterway the whole system is endangered and waterway repairs are always difficult.

If the discharge end has scoured the cause may be obvious, such as erosion in the waterway due to poor cover, or the banks discharging straight into a gully, slilt-pit or dam. Other causes may be stock damage or, more likely, carelessness in driving machines and vehicles through the discharge area. If the cause is not obvious the original fall along the channel should be checked with a level at close intervals for at least the last chain. The level should be placed on remnants of the original channel bed or at points along the uphill edge of the channel.

What can be done will vary with the site and a combination of treatments may be needed.

The bank may be cut shorter if it can still be discharged on to good grass cover. The cut or break should be made at least 12 feet wide.

If only the discharge end is on too steep a grade, it may be possible to push the bank uphill to its correct level. The new section of channel must be made full-width and cut to continue smoothly from the old section.

In many cases there will be a need for refilling with topsoil and a heavy dressing of seed and fertilisers. This should be protected by a thin straw mulch held in place by wire netting firmly pegged down. The straw mulch should not be more than one inch thick. Loose stoning is not recommended as water usually swirls among the stones and cuts beneath them. A material known as jute mesh (now available in W.A.) serves the same purpose as the wire netting and straw mulch. It is designed to protect the soil while grass is becoming established.
In some cases a "level-sill" outlet, a lengthening of the channel beyond the end of the bank, will provide a remedy. To protect the level channel edge, the sill over which the water spreads, a short fence should be built. This need only consist of a few steel posts and plain wires or netting. Such a simple barrier, can be of great value at any type of bank discharge. By keeping stock and vehicle tracks away from where water flows it will save damage at a vital point of a contour system.

Be Prepared for Wet Seasons
It is easy to be lulled into a feeling of false security by a series of below average rainfall seasons with few winter storms. Because the contouring had practically eliminated run-off in seasons before 1963, many farmers had seen little need for maintenance of banks. Some had even ploughed and cropped through planned waterways because "no water had ever run there since the banks were put in."

The winter of 1963 has shown the need for:

1. Ample bank size, and reinforcement of weak spots when the banks are first built.
2. Immediate repair of any damage which occurs.
3. Regular attention to maintain bank size and channel capacity.

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<td>MANJIMUP</td>
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<td>YORNUP</td>
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<td>BRIDGETOWN</td>
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<td>GREENBUSHES</td>
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