



Description

A diversion bank is a compacted ridge of soil or other material used to intercept concentrated water flows and return the water back to natural overland sheet flows. Diversion banks are also referred to as rollover banks or erosion control banks.

Application and Function

Banks of different shapes and heights are used depending on the situation and the diversion requirement. Diversion banks are used on roads, tracks and fence lines to prevent or control erosion. Trafficable diversion banks are generally low and broad, whereas diversion banks used on areas being rehabilitated are higher and designed not to be trafficable.

Large and quite often very long diversion banks are generally used to divert water away from existing areas of erosion. The main purpose of diversion banks is to assist in rehabilitation by removing and/or reducing flows.

Limitations

Earth moving machinery is usually required to construct diversion banks. Depending on the type and number of banks required, construction times can be lengthy.

Advantages

Diversion banks are simple to construct, can divert small and large water flows, and are cheap to install. Material for the construction of the earth banks can be obtained on the site or imported. The construction of diversion banks is ideal in remote locations where importation of materials for erosion control is impractical.

If diversion banks are designed properly they reduce the need for table drains and other cross drainage works such as floodways and culverts.

Alternatives

Depending on the location, alternatives such as formalised drainage (culverts, mitre drains, table drains, etc) can be used on roads and tracks. Erosion control structures, such as drop structures can be used in areas of erosion, however these are more costly and time consuming to install.

Construction

It is important to place diversion banks in the right location. Diversion banks can be constructed in two ways:

- Cut and push. Lines are ripped across the area at a grade of 0.3%. A shallow channel should be cut along this line (approximately 0.6 metres deep). Excavated material is dumped on the down slope side of the channel then compacted and smoothed out to form a bank with even batters and a level top. Allow for compaction of the material, which is usually one third, with the compacted ridge not less than 0.5 metres high depending on its purpose.

- Imported Material. Use imported soil material to construct a bank with a grade of between 0.3 and 0.5%. Allow for compaction of the material, which is usually one third, with the compacted ridge not less than 0.5 metres high depending on its purpose.

To aid trafficability, an approach and departure ramp is shaped during construction of the bank. The bank should direct runoff into undisturbed vegetation or into an existing drain (care needs to be taken to ensure that erosion does not occur where the water runs down into the drain).

Alternatively a level sill can be constructed at the end of the bank to enhance the spread of water back to sheet flow.

A level sill is a shallow excavation at the end of the bank, typically 5 – 7m long by 3m wide and 0.3m deep allowing water to flow out evenly along the length of the sill. There should be no disturbance to the ground surface down slope of the sill outlet.

Bank design depends on slope, catchment, soil erosion risk and expected peak flows. The below tables recommend bank spacing for various slopes. Where soils are more stable, banks can be spaced further apart.

Bank Spacing for Tropical Regions

Slope		Diversion bank spacing (metres)
%	Gradient	
0.5	1:200	120-130
1	1:100	90-100
2	1:50	60-70
3	1:33	50-60
4	1:25	45-50
5	1:20	40-45
6	1:17	35-40
10	1:10	28-33
18	1:5.5	15-20

Bank spacing for Arid and Semi-arid Regions

Slope		Diversion bank spacing (metres)
%	Gradient	
0.5	1:200	170-180
1	1:100	120-130
2	1:50	90-100
3	1:33	70-80
4	1:25	60-70
5	1:20	55-60
6	1:17	50-55
10	1:10	40-45
18	1:5.5	25-30

Trafficable diversion banks can vary in size. They can be a few metres long and 50cm high on walking tracks.

Large diversion banks have the same construction principles but their application is different. They may be large, gently sloping banks up to 30-40m long and up to 3m high on deeply eroded areas. Major gullies need a large diversion bank to divert water from the gully head and prevent further erosion. It may be necessary to build several banks.

If the diversion bank is placed on or near a road, track or fence line, it is important to remember that driving around the ends of banks often leads to erosion of the banks, so don't drive close to them. If a number of eroded tracks are next to each other, extend banks across all tracks to be repaired.

Maintenance

Diversion banks are used in many different situations and conditions. As with any erosion control structure, banks need to be inspected to ensure that they are performing the function they were designed to do.

On roads, tracks and fence lines, diversion banks will often be eroded away due to vehicular traffic. If this is the case, the bank may either be not broad enough or too low to handle the traffic that it is experiencing.

It is generally good practice to spread wear and tear across the trafficable bank.

Additionally it is important to assess how the structure is working. The diversion bank should not pond water after rain and the outlet should not be eroding. Diversion banks aid in the maintenance of natural cross drainage, so vegetation on the down slope side of a road, track or fence line should not be starved of water.

Should any of these problems be encountered, the structure needs rectifying to ensure that its function is maintained. It is important to rectify any problems before erosion is initiated.

Contact details

For further information contact the DLRM Land Management Unit in your region. Additional Technical Notes and Erosion and Sediment Control Guidelines are available on the website: <http://www.lrm.nt.gov.au/soil/management>

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