4

REVETTING AND SUPPORTING RIVER BANKS

4.3 Log toe and geotextile revetment with willow slips

River Skerne

LOCATION – Darlington, Co Durham, NZ 301160
DATE INSTALLED – October 1995 (standards planted March 1996)
LENGTH – 91 metres
COST – £146 /metre

NOTE: A full description of this technique is provided in the Environment Agency R & D Technical Report W83:– *Revetment Techniques used on the River Skerne Restoration Project* (1998)

Log toe revetment three years after construction

DESCRIPTION

This technique demonstrates revetment using tree trunks or large boughs along the water's edge to stabilise the toe of reformed banks. Proprietary nylon geotextile is used to revet the bank above the logs so that willow plants can safely be established within it. Revetment was needed to protect a gas main in the bank and loose backfill closing off a length of redundant channel.

DESIGN

Three vertical zones within the river bank were considered as follows:

Below water
Crushed rock was used to line the newly excavated channel around a sharp bend, as well as the initial infill of the redundant channel. Details of the rock, and the rationale behind its use, are as explained in 4.2. The rock was incorporated around fencing posts driven to mark the line of the new bank toe.

Water's edge and lower bank
Logs were laid out along the top of the rock and lightly wired to the fencing posts to prevent flotation. Logs were then strained tight against the posts using twist wires anchored to stakes set well back into the fill. These ensure that the logs can never float away even if major settlement or scour of the river bank arises.

The logs selected were of oak, sized up to 500mm diameter, but virtually any timber is suitable because they need not be durable if willow is to be planted above. The use of live willow logs that will rapidly regenerate along the toe may be appropriate in some situations.

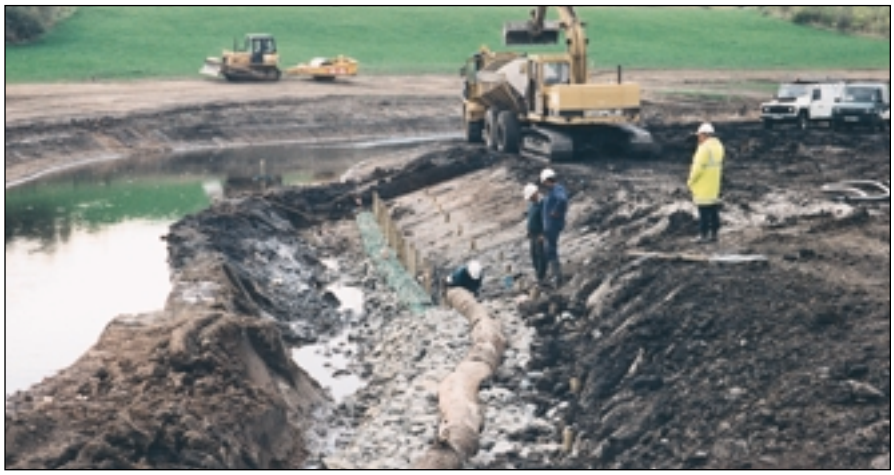
Backfill was then extended to about two thirds bank height and profiled as shown. Geotextile (Enkamat 7220) was fixed to the log under nailed wooden boards, pinned down over the bank and covered with soil.

Upper bank
Infilling was completed leaving a ledge as shown. All of the above represents no more than a secure but flexible matrix within which plants can be introduced to become established as the long term revetment medium. Coir pallets pre-planted with marginal aquatic species were fixed along the front of the logs and reed canary-grass planted in the damp zone above. Grey and goat willow plants, as well as some un-rooted slips, were set within the geotextile and standard trees planted along the upper ledge.

This mixture of plants is intended to be successional. Whilst the willow will quickly dominate the lower banks, as roots penetrate the underwater rock, the standard trees may eventually dominate the willow, particularly if this is regularly coppiced.

SUBSEQUENT PERFORMANCE 1995/98

This technique was used in two locations and both have performed well with dense willow growth up to 2m high along the bank and a thick margin of plants along the water's edge, all of which are acreting river silts in successive floods. Rooted willow plants established much more strongly than unrooted slips, but this is not uncommon with the grey/goat species selected. Other willow varieties are known to strike readily from slips. Species that are indigenous to the site are always preferable. Brushwood containing willow cut locally can be built into the lower banks as an alternative to the geotextile utilised at the Darlington site which was virtually barren of trees.



Log toe revetment during construction

Figure 4.3.1
PROFILE OF LOG TOE REVETMENT