

EROSION CONTROL BLOCKS FOR SLOPING BANK PROFILES

Fairland Stream

“To provide protection to the river bed and embankment we made use of a combination of gabion and Terrafix blocks, which have proven highly successful in stream bed armouring in the Johannesburg Botanical Gardens”

The advantage of Terrafix blocks, Mr Holland said, is that if correctly installed they are able to withstand turbulence and water velocities which can wash out most other erosion protection systems.

“The system is also highly plantable and, importantly, provides nesting areas for creatures such as frogs and crabs. In this way Terrafix assists in bringing back essential life to dead streams”

“Furthermore, the combination of vegetated Terrafix blocks and the pools, which we have created, should attract a lot of fish and bird life.”

Bruce Holland, Johannesburg Metropolitan Council, Urban Management.

Rennies Wetland Project

“In the past grasslands and wetlands acted as a sponge to absorb water and dampen peak flows. These days, a lot of Gauteng is paved so water hardly soaks into the ground any more. Instead, it runs off in great volumes and at great speeds into storm water drains and the into the rivers.

“And look at the state of our rivers – there is little natural grass or indigenous tree cover along the banks any more to stabilise them.

As a result, storm water slices off great chunks of river banks as it ploughs through, creating large, straight channels that encourage even greater water speeds, which drown people and livestock, carrying off homes and flushing away bridges.” David Lindley, Director of the Rennies Wetland Project.

In a nutshell the basic guidelines depicted on page 2 apply. A feasibility study conducted for Terraforce by The Council for Scientific and Industrial Research provides further design guidelines.



Fairland River



River Bank



Sloping Embankment

BASIC GUIDLINES FOR THE USE OF EROSION CONTROL BLOCKS

Minimum Requirements (Hewlett et al. 1987)

Block mass --- 15 kg	Mass/m ² --- 135 kg/m ²
Thickness --- 85mm	Ave block width --- 255 mm

Where flow velocities of over 6m/s are expected to occur, these should be reduced with weirs of concrete retaining blocks or gabions. Should this not be possible and where flow depths are greater than 1.5m, side walls of concrete retaining blocks or gabions, as well as ground anchor for the bed lining should be considered. Erosion control blocks are ideally suited for flow velocities between 6m/s and 3m/s, provided that oscillation is effectively prevented.

This is best achieved by providing sufficient lateral restraint between adjacent blocks (more than 75% face contact between blocks) and with mechanical anchors into the subsoil. Generally no special considerations should be necessary for flow velocities below 3m/s expect standard requirements such as • drainage • reinforcing for overtopping • backfill details • protecting from scour • providing for lateral inflow • alignment • position of weirs • vegetation • maintenance.

A case study presented for the Global Alliance for Building Sustainability (GABS) at the recent World Summit for Sustainable Development argues for the use of articulated concrete blocks as an effective erosion control method in protecting increasingly scarce natural resources. Below is a short extract from the case study with a complete version posted on www.terraforce.com

Arguably, design of erosion control measures should be based on a multi-disciplinary approach, involving engineers, landscape architects, horticulturist and environmental experts. The U.S. based N.C.M.A. (Reference Tec 11- 9A Articulated Concrete Blocks for Erosion Control) published a few guidelines.

- Blocks are placed together to form an erosion-resistant overlay with specific hydraulic performance characteristics.
- Includes a geotextile underlay to allow infiltration and exfiltration and to provide particle retention of the soil subgrade.
- Systems are simple to produce, easy to install and environmentally friendly.
- ACBs have excellent resistance to hydraulic shear and overtopping conditions.
- The ability to support the ecosystem's habitat is a major advantage.
- Easy and fast to install, easy to inspect.
- Cabled systems can facilitate machine placement. Cables don't increase hydraulic or structural values however.
- Can be constructed in virtually seamless fields.
- Are not designed to add structural strength to steep slopes.



Small Stream

