The ProFix-system

By the simplicity of its construction the **ProFix**-system can be installed almost everywhere. Empty mattresses are delivered at site, largely pre-fabricated. Often suitable fill material can be found nearby. The equipment and/or tools are mostly small and easy to mobilise. Filling can be done "dry" or "wet" by manual labour. **ProFix** can be unrolled and filled directly onto the banks. The filled mattress may eventually be shifted to lower located parts of the slope under water.

The upper filter-cloth of **ProFix** - a green coloured non-woven - provides extra lasting u.v. protection.

ProFix provides attractive possibilities for a "natural" riverbank.

Sungai Air Itam

Penang Malaysia

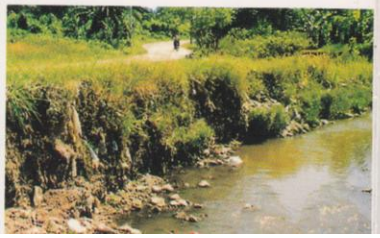
Social and Environment Acceptability

ProFix-protection will become part of the landscape and local ecological system.

ProFix is a safe and friendly system of protection which allows opportunities for recreation activities.

Sungai Mulia

Wilayah Persekutuan Malaysia



ProFix is a flexible erosion control system composed of filter-cloths and granular material. The system was devised for the Dutch Delta Scheme and offers attractive alternatives for several existing methods.

ProFix is a fast and cheap method. The system is durable, permeable, allows plants to grow on it, and does not harm the environment.

The system is variable and adaptable, enabling tailor made erosion control solutions.

Composition and Properties

By its composition, the **ProFix**-system becomes a flexible and current resistant mat with excellent filter properties. Both filter-cloths must be soiltight. Moreover, the upper cloth is extra stabilised against u.v. Radiation.

The cloths allow plants roots to penetrate thus providing extra protection to the construction.

The required strength of the filter-cloths depends on the exposed loads, for example the design of slopes, method of filling and laying, the thickness and weight of the fill material.

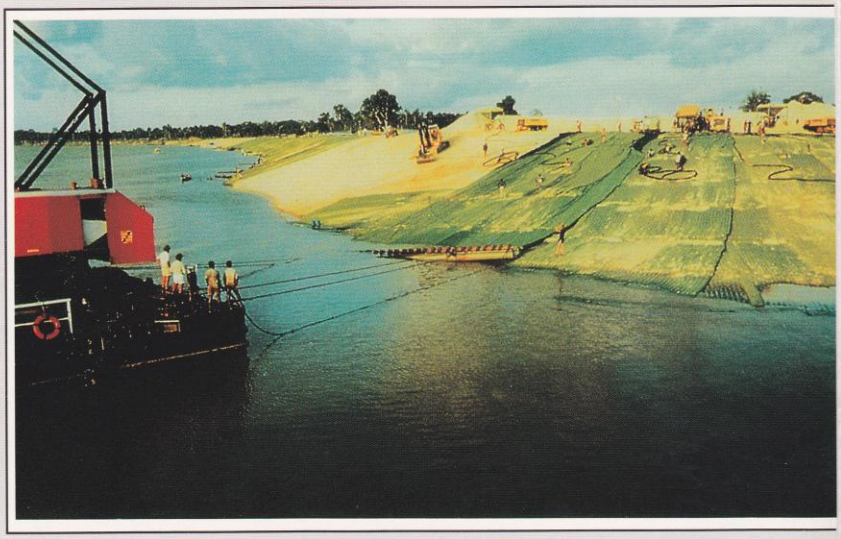
Sand and/or gravel are the most suitable for fill material, but certain soils can be used as well. Mixing of seeds can promote vegetation.

The sewn seams of **ProFix** are shielded from mechanical damage due to the strong curving of the filled mat. The distance between the seams depends on the required height/weight of the mattress.

Transportation and preparation

The material will be supplied in ready-made sheets of 5m wide and is being transported to the site in rolls. After unrolling, final position is effected by pulling and placing the mat sections by hand. Larger areas can be made by sewing the sheets of 5m wide **ProFix** with a hand-sewing machine on site.

A clamping beam for lifting and placing filled **ProFix** sections by crane can be made available.

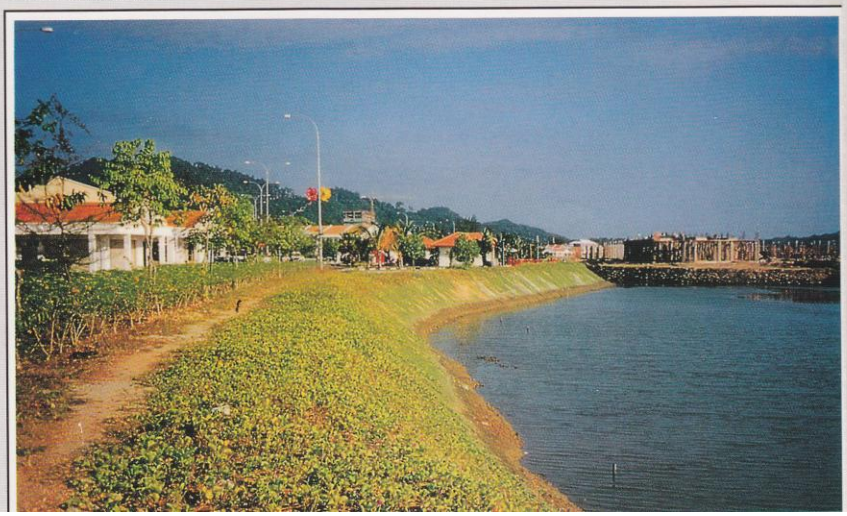


Sagbama

Rivers State Nigeria

Langkawi Malaysia

Langkawi Malaysia



Stability

ProFix provides a stable mat, able to withstand high currents and limited wave action.

Larger mats can be made by sewing or overlapping

With special care to the overlapping, flow velocities become critical between 5 and 6 m/s.

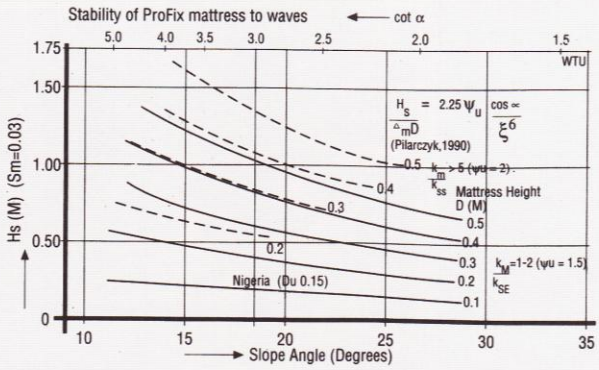
If the permeability of the mat is larger (5 to 10 times) than the subsoil, no uplift of the mat due to wave action will be encountered.

Flexibility

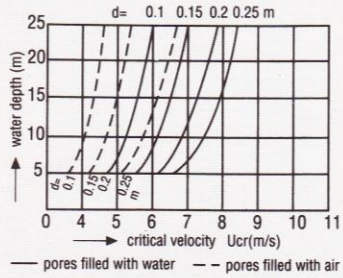
Irregularities on banks and beds are easily overcome.

The risk that the current will gradually erode the soil under the mattress edges is neutralised by the fact that the flexible mat will fall into the scouring and form a new line of protection.

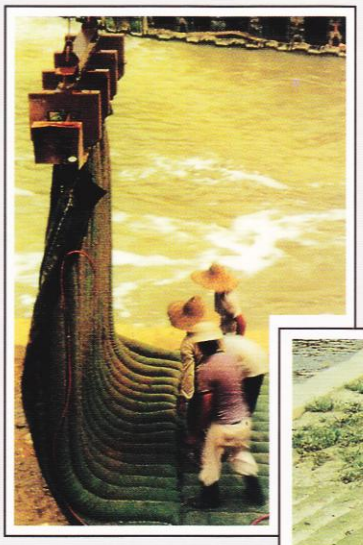
This may locally proceed over some distance until a stable equilibrium situation is reached.

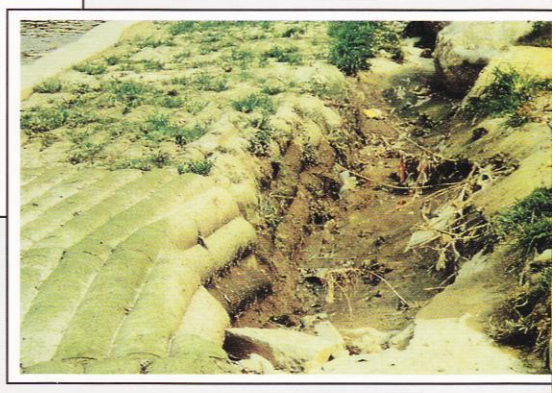


Mattress height as function of waveheight, slope angle and relative permeability.

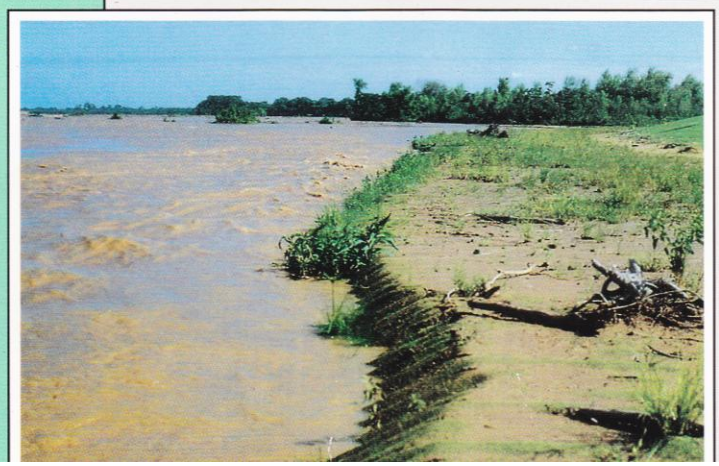


Critical flow velocity as a function of water depth and mattress height for i_s=0.





Sungai Batu and Sungai Gombak confluence Wilayah Persekutuan Malaysia



Rio Pirai

Filling

For the filling different systems are available.

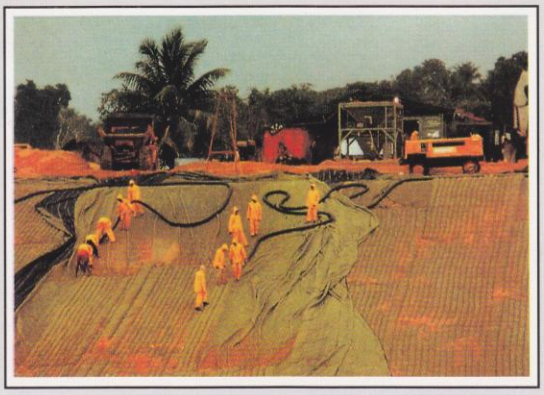
1. Pneumatic filling

This system is very suitable where large areas of **ProFix** have to be installed. By means of a compressor and a sandhopper with feeder, the sandfill is blown through a flexible hose into the **ProFix**-tubes.

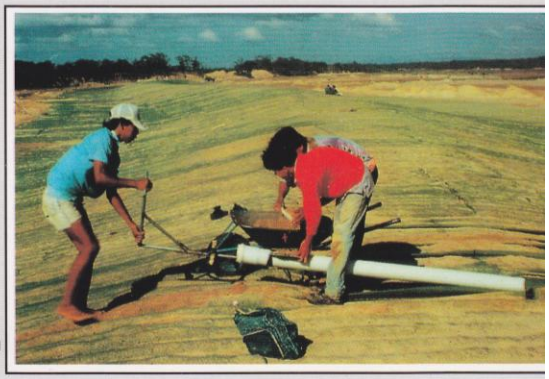
2. Dry filling

This system is suitable for jobs where large areas can be filled in the dry simultaneously by a great number of labourers.

A PVC-pipe is inserted into the **ProFix**-tube, sand is dropped through the fill-opening in the pipe and subsequently rammed down with a concrete rammer. The advantage of the ramming is that the sand ballast inside the **ProFix** is reasonably compacted.



Sand filling operation (Air compressor method)



Sand filling operation (Rammer method)

Equipments for sand filling: plastic tube, metal hooks, concrete rammer with pipe casted in.

Sand filling operatio (Water method)

3. Wet filling

The wet-filling system is similar to the dry-filling method with the rammer but here the sand is being washed down by a waterjet. The wet filling provides a more continuous process with a well compacted sand ballast inside the **ProFix**.

Anchoring

When used on steep slopes or in areas with strong currents or fluctuating water levels it is advised to anchor the mats on top of the slope in a trench. After backfilling the trench the developing vegetation will protect and hide the build-in

Anchoring back of ProFix Mattress