Filter Fence

SEDIMENT CONTROL TECHNIQUE

Type 1 System		Sheet Flow	✓	Sandy Soils	✓
Type 2 System		Concentrated Flow		Clayey Soils	[1]
Type 3 System	✓	Supplementary Trap		Dispersive Soils	

[1] Capture rate of fine clay-sized particles may be poor, but can be improved through the use of thicker, heavy-duty filter cloth.

Symbol FF

Photo 1 – Filter fabric

Photo 2 – Filter fence placed down-slope of earth stockpile

Key Principles

1. Primary treatment mechanism is the *filtration* of medium to coarse-grained particles from stockpile runoff, rather than gravity-induced settlement. The process will not remove turbidity (colour) from the passing water.
2. The fabric must consist of a non-woven geotextile, **not** woven fabric.
3. Only suitable for use in the de-watering of stockpiles, and only when compost filter berms/tubes are not practical or available.
4. A filter fence is **not** a suitable replacement for a traditional *Sediment Fence*, unless installed immediately down-slope of an earth stockpile.

Design Information

Non-woven geotextile fabric, 'bidim' A34 or the equivalent.

Maximum support post spacing of 1.5m, or 2m if a wire mesh support frame is used (not wire ties).

Filter fences may also be supported by a continuous (i.e. closely butted) row of straw bales, anchored one stake per bale. The filter cloth must fold over the top of the bales, with the anchor post staked through the fabric and bale.

The filter cloth may also be wrapped around a 400mm high (min) berm formed from composted material. Such designs typically provide higher treatment during de-watering operations.

In all cases, the lower 300mm of filter cloth must be buried in a 200mm (min) deep trench (backfilled and compacted), or a continuous 200mm high (min) sand or aggregate berm.

Preference should be given to the use of compost filter berms/tubes wherever practical.

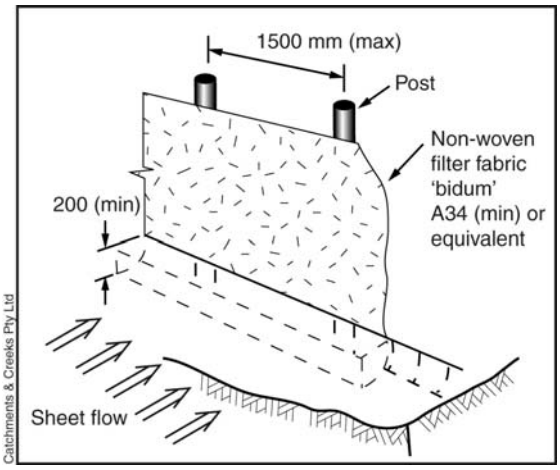

Figure 1 – Installation of filter fence without wire mesh backing

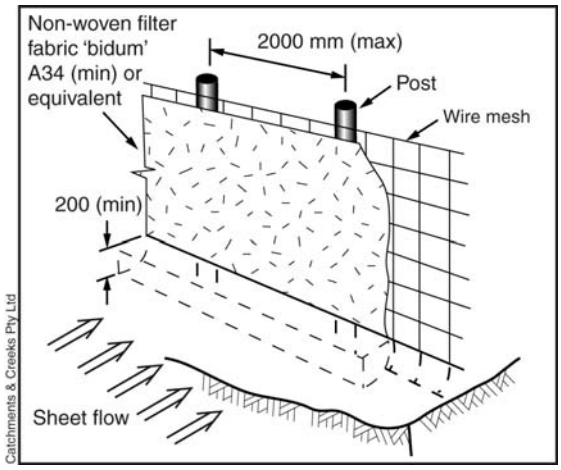

Figure 2 – Installation of filter fence with wire mesh backing

Description

A filter fence is a type of filter barrier consisting of non-woven geotextile fabric staked as a vertical fence.

Various design options exist similar to the various side wall structures found in the formation of a de-watering *Filter Pond*.

In its simplest form, a filter fence consists of heavy-duty, non-woven filter cloth staked at maximum 1.5m centres. Alternative design options include:

- filter cloth backed with wire mesh;
- filter cloth backed with straw bales;
- filter cloth wrapped around a 400mm (min.) high compost berm.

Purpose

Used to filter medium to coarse-grained sediment from storm runoff originating from earth stockpiles, and process water originating from the de-watering of excavated materials.

Limitations

Only suitable for very low flow rates.

Generally has very limited control over turbidity levels, unless incorporated with a suitable grassed *Buffer Zone* down-slope of the filter fence.

Advantages

Quick to install.

Provides better capture of medium-grained sediments than a traditional *Sediment Fence*.

Various design options exist that can improve the filtration process.

Disadvantages

The process will generally not remove turbidity (colour) from the passing water.

Special Requirements

If space is limited, then placing a row of straw bales between the stockpile and the filter fence will help to prevent direct contact between the stockpiled material and the filter fence.

Common Problems

Water passing under poorly buried fabric.

Stockpiled material leaning up against the filter fence (Photo 2), causing the fence to collapse.

Location

Only for use down-slope of earth stockpiles.

Not for use as a general sediment trap.

Site Inspection

Check for signs of water bypassing the structure.

Check for material leaning against the fence.

Materials

- Geotextile fabric: non-woven filter cloth (minimum 'bidim' A34 or the equivalent). Wide strip tensile strength (AS3706.2) minimum 15 kN/m in both directions. Pore size (EOS, O_{95}, AS 3706.7) less than 110 µm. Mass per unit area (AS3706.1) minimum 200gsm.
- Support posts/stakes: 1500mm^2 (min) hardwood, 2500mm^2 (min) softwood, or 1.5kg/m (min) steel star pickets suitable for attaching fabric.
- Backing mesh: plastic or steel mesh with a maximum mesh opening of 200mm.

Installation

1. Refer to approved plans for location, and construction details. If there are questions or problems with the location or method of installation, contact the engineer or responsible on-site officer for assistance.
2. Unless otherwise directed by the responsible on-site officer, excavate a 200mm wide by 200mm deep trench along the proposed alignment of the filter fence, placing the excavated material up-slope of the fence.
3. If the filter fence is to be staked without a mesh backing, then secure the support posts into the ground at a spacing no greater than 1.5m.
4. If the filter fence is to be staked with a mesh backing, secure the support posts into the ground at a spacing no greater than 2.0m, then securely attach the backing mesh to the up-slope side of the support posts from a continuous length of mesh. Extend the mesh into the excavated trench.
5. If the filter fence is the be supported by straw bales, then after suitable anchoring the bottom 300mm of fabric, place a continuous row of straw bales immediately down-slope of the fabric and wrap the fabric over the top of the straw bales. Securely anchor the filter fence with a single stake driven through the fabric and centre of each bale.
6. Using a continuous length of non-woven geotextile, securely attach the fabric to the up-slope side of the support posts or backing mesh, with the fabric extended at least 200mm into the trench.
7. Backfill the trench and tamp the fill to firmly anchor the bottom of the fabric to prevent displacement of the fabric and to prevent the free movement of water under the fabric.
8. In all cases, install the filter fence in a manner that will minimise the risk of sediment-laden water flowing around the fence.

Maintenance

1. Inspect the filter fence regularly and at least daily during de-watering operations. Make repairs as needed to the fabric and support frame.
2. Inspect the fabric for obvious leaks resulting from holes, tears or joint failure in the fabric.
3. Check that water has not overtopped the fence at low points.
4. Repair any torn sections with a continuous piece of fabric placed inside the old fabric, extending at least from support post to support post.
5. Check for materials leaning up against the filter fence. Make repairs as needed to the fabric and support frame.

Removal

1. Remove all accumulated sediment and dispose of it in a suitable manner that will not cause an erosion or pollution hazard.
2. Remove all materials and repair damage to the ground surface as necessary.
3. Appropriately rehabilitate (e.g. revegetate) the ground as necessary to minimise the risk of an ongoing erosion hazard.