

Fibre Rolls

SEDIMENT CONTROL TECHNIQUE

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

[1] Fibre rolls may be used to form *Check Dam Sediment Traps* in minor drains.

Symbol FR



Photo 1 – Fibre roll staked across a uniform slope



Photo 2 – Fibre roll supplementary sediment trap around a field (drop) inlet

Key Principles

1. Sediment trapping is primarily achieved through gravity-induced settlement resulting from ponding up-slope of the rolls. Therefore, it is essential for the fibre rolls to be placed perpendicular to the direction of flow (e.g. along the contour) to maximise the surface area of this pond.
2. Key design parameter is the maximisation of the pond surface area up-slope of the rolls.
3. Key operation issues include the control of traffic damage that may flatten the rolls, or water damage that may displace the rolls.

Design Information

Table 1 provides the recommended maximum spacing of fibre rolls placed along the contour on uniform slopes.

Table 1 – Maximum spacing down non-vegetated or newly seeded slopes

Maximum spacing	Conditions
3m	<ul style="list-style-type: none"> • Steep slopes (> 4H:1V). • Highly erosive soils on mild to steep slopes. • Sandy soils on mild to steep slopes.
5m	<ul style="list-style-type: none"> • Loamy soils on mild slopes (10:1 to 4:1). • Any soil not mulched, hydromulched or similar on low to mild slopes (< 4:1).
8m	<ul style="list-style-type: none"> • Erosion resistant soils on mild slopes (< 6:1). • Loamy soils on low gradient slopes (< 10:1).

Minimum sock diameter of 200mm.

Fibre rolls should be trenched 75 to 125mm in sandy soils and 50 to 75mm in clayey soils.

Maximum stake spacing of 1.2m or six (6) times the fibre roll diameter (whichever is the lesser). A maximum stake spacing of 0.3m applies when used to form check dams.

When used in areas of sheet flow, fibre rolls must be placed along the contour to maintain uniform flow conditions passing the fibre roll.

Adjoining socks must be overlapped at least 450mm.

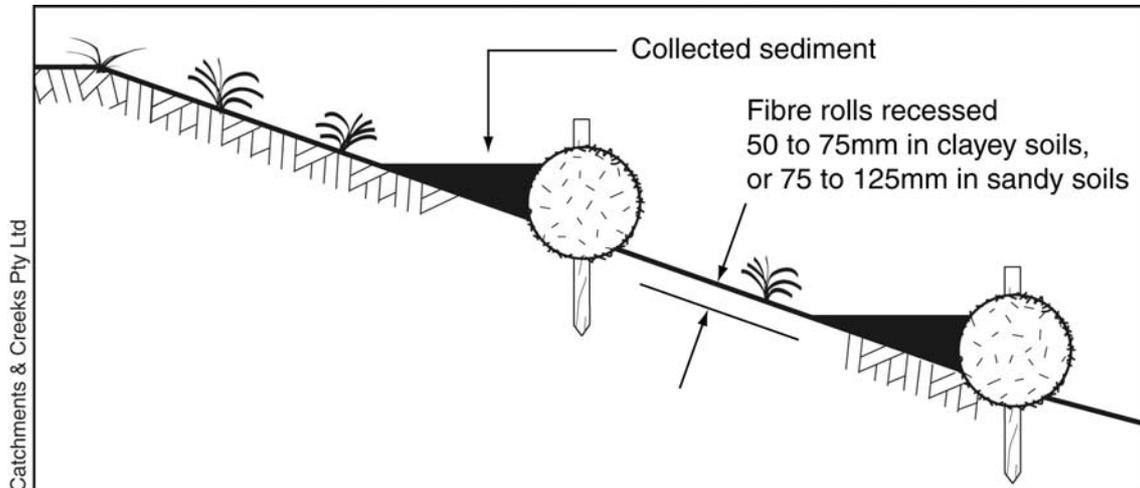


Figure 1 – Fibre rolls placed along the contour in areas of sheet flow



Photo 3 – Compost-filled socks used as a 'living' vegetated bank



Photo 4 – Fibre rolls used as an end-of-day flow and sediment control system



Photo 5 – Fibre rolls used as a minor sediment trap and flow protection for the adjacent mulched batter



Photo 6 – Fibre roll damaged (flattened) by traffic, but still functional

Description

Straw, cane mulch, or other similar fibrous materials bound into a tight tubular roll.

Fibre rolls normally have a tubular roll (sock) formed from open mesh that does not aid in the 'filtration' of pollutants.

Fibre rolls are usually significantly smaller in diameter than *Compost-filled Filter Socks* and the larger diameter *Geo Logs* used for stream bank protection.

Purpose

Used as a supplementary sediment trap on mild-sloping earth slopes and around field (drop) inlets.

They can also be used to form a *Check Dam Sediment Trap* in minor drainage channels.

Filter rolls can also be used to help maintain 'sheet' flow conditions down a disturbed slope, thus delaying the formation of rill erosion.

When placed at regular intervals down a newly mulched or hydromulched slope, the fibre rolls can reduce the risk of the mulch being washed from the slope, as well as capturing sediment and mulch displaced by storms.

Limitations

Sediment and pollutant trapping ability is generally significantly less than *Compost-filled Filter Socks*.

Fibre rolls generally do not provide the pollutant adsorption features of *Compost-filled Filter Socks*.

Fibre rolls are not suitable for use on slopes subject to slippage, slumping or creep.

Advantages

Light and easy to transport into difficult locations.

The fibre rolls usually can be left in place to biologically degrade, however, some products contain plastic mesh (outer roll), and thus have associated environmental risks.

Disadvantages

Rolls are easily damaged—this being the primary reason for their classification as a 'supplementary' sediment trap rather than a Type 3 system.

Difficult to move when wet.

Can float away if not adequately staked.

Very limited sediment retention volume.

Can aggravate bank erosion if not located along the contour.

Special Requirements

Fibre rolls should be trenched 75 to 125mm in sandy soils and 50 to 75mm in clayey soils.

Ensure both ends of the fibre roll are adequately turned up the slope to prevent flow bypassing prior to water passing over the rolls.

Location

Placed along the contour at regular intervals down mild-sloping earth batters.

Long, newly seeded slopes where it is important to maintain sheet flow conditions.

Filed inlets with small drainage catchments.

Common Problems

Often installed without adequate trenching.

Flattened by vehicular and pedestrian traffic.

Site Inspection

Check for sufficient anchorage (pegging) along its full length.

Ensure the fibre rolls have been placed along the contour such that water will pond evenly along the length of each roll.

Check for damage to the fibre rolls and actual or potential wash-outs.

Materials

- Fibre rolls: typically 200 to 250mm jute, coir or straw roll tied with synthetic or biodegradable mesh.
- Stakes: minimum 20 by 20mm timber stakes.

Installation

1. Refer to approved plans for location and installation details. If there are questions or problems with the location, dimensions or method of installation contact the engineer or responsible on-site officer for assistance.
2. When placed across non-vegetated or newly seeded slopes, the rolls must be placed along the contour.
3. If placed on open or loose soil, ensure the fibre rolls are trenched 75 to 125mm in sandy soils and 50 to 75mm in clayey soils.
4. Ensure the outer most ends of the fibre roll are turned up the slope to allow water to adequately pond up-slope of the roll, and to minimise flow bypassing.
5. When placed across the invert of minor drains, ensure the socks are placed such that:
 - (i) the crest of the downstream roll is level with the channel invert at the immediate upstream sock (if any);
 - (ii) each roll extends up the channel banks such that the crest of the fibre roll at its lowest point is lower than the ground level at either end of the roll.
6. Ensure the anchoring stakes are driven into the end of each roll and along the length of each roll at a spacing not exceeding 1.2m or six times the roll diameter, whichever is the lesser. A maximum stake spacing of 0.3m applies when used to form check dams.
7. Adjoining roll must be overlap at least 450mm, not abutted.

Maintenance

1. Inspect all fibre rolls prior to forecast rain, daily during extended periods of rainfall, after significant runoff producing storms or otherwise at weekly intervals.
2. Repair or replace damaged fibre rolls.
3. Remove collected sediment and dispose of in a suitable manner that will not cause an erosion or pollution hazard.

Removal

1. All excessive sediment trapped by the rolls must be removed from the drain or slope if such sediment is likely to be washed away by expected flows.
2. Dispose of collected sediment in a suitable manner that will not cause an erosion or pollution hazard.
3. The biodegradable content of the straw rolls may not necessarily need to be removed from the site.
4. All synthetic (plastic) mesh or other non readily biodegradable material must be removed from the site once the slope or drain is stabilised, or the rolls have deteriorated to a point where they are no longer providing their intended drainage or sediment control function.