Fiber Rolls

Description and Purpose
A fiber roll (also known as wattles or logs) consists of straw, coir, curled wood fiber, or other biodegradable materials bound into a tight tubular roll wrapped by plastic netting, which can be photodegradable, or natural fiber, such as jute, cotton, or sisal. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications
Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

- At the end of a downward slope where it transitions to a steeper slope.

- Along the perimeter of a project.

- As check dams in unlined ditches with minimal grade.

- Down-slope of exposed soil areas.

Categories

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<tr>
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<td>NS</td>
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<td>WM</td>
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Legend:
- ✔️ Primary Category
- ❌ Secondary Category

Targeted Constituents

<table>
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<tr>
<th>Constituents</th>
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<tbody>
<tr>
<td>Sediment</td>
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<td>Metals</td>
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<td>Bacteria</td>
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<td>Oil and Grease</td>
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Potential Alternatives

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<th>Alternative</th>
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<td>SE-1</td>
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<td>Gravel Bag Berm</td>
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<td>SE-8</td>
<td>Sandbag Barrier</td>
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<td>SE-12</td>
<td>Manufactured Linear Sediment Controls</td>
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<tr>
<td>SE-14</td>
<td>Biofilter Bags</td>
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- At operational storm drains as a form of inlet protection.
- Around temporary stockpiles.

**Limitations**
- Fiber rolls should be used in conjunction with erosion control, such as hydroseed, RECPs, etc.
- Fiber rolls with plastic nets trap and kill wildlife and are unsuitable for long term use. Fiber rolls with plastic nets must be removed and disposed of at a landfill.
- Only biodegradable fiber rolls containing no plastic are suitable for long term or permanent stabilization.
- Fiber rolls installed by the “Type 1” method are not effective unless trenched in and staked. If not properly staked and trenched in, fiber rolls will not work as intended and could be transported by high flows.
- Fiber rolls installed by the “Type 2” method are not effective unless staked. If not properly staked in, fiber rolls will not work as intended and could be transported by high flows.
- Not intended for use in high flow situations (i.e., for concentrated flows).
- Difficult to move once saturated.
- Fiber rolls have a limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months, depending upon local conditions and roll material.

**Implementation**

*Fiber Roll Materials*
- Fiber rolls should be prefabricated.
- Fiber rolls are made from weed-free rice straw, flax, curled wood fiber, or coir bound into a tight tubular roll by netting or natural fiber (see Limitations above regarding plastic netting).
- Typical fiber rolls vary in diameter from 6 in. to 20 in. Larger diameter rolls are available as well. The larger the roll, the higher the sediment retention capacity.
- Typical fiber rolls lengths are 4, 10, 20 and 25 ft., although other lengths are likely available.

*Installation*
- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
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- Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).

- Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).

- Prepare the slope before beginning installation.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.

- Turn the ends of the fiber roll up slope (J-hook) to prevent runoff from going around the roll.

- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.

- Type 1 Installation
  - Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

  - Start building trenches and installing rolls from the bottom of the slope and work up.

  - It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.

  - Stake fiber rolls into the trench.
    - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
    - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.

- Type 2 Installation
  - Lay roll out along contour.

  - Use notched hardwood stakes with a nominal classification of 1 by 2 in. and minimum length of 24 in.

  - Alternate stakes in front and behind the roll approximately every 24 in. Drive stakes into the soil in front of and behind the roll until the notch is even with the top of the fiber roll.

  - It is recommended that pilot holes be driven with a straight bar into the soil for the wooden stakes.

  - Lace the rope between stakes and over the fiber roll. Knot (half hitch) the rope at each stake.

  - Tighten the fiber roll to the surface of the slope by driving the stakes further into the soil.
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- See typical fiber roll installation details at the end of this fact sheet.

**Removal**
- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Fiber rolls encased with plastic netting or containing any plastic material need to be removed from the site for final stabilization. Fiber rolls used in a permanent application are to be encased with a non-plastic material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance; therefore, during the BMP planning phase, the areas where fiber rolls will be used on final slopes, only fiber rolls wrapped in non-plastic material should be selected.

- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

**Costs**
Material costs for straw fiber rolls range from $26 - $38 per 25-ft. roll1 and curled wood fiber rolls range from $30 - $40 per roll2.

**Inspection and Maintenance**
- Inspect and verify that BMPs are in place prior to the commencement of associated activities.

- Repair or replace split, torn, unraveling, or slumping fiber rolls.

- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.

- Repair any rills or gullies promptly.

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1 Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.
2 Costs estimated based on vendor query by Tetra Tech, Inc. 2016.
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Typical Fiber Roll (Type 1) Installation
N.T.S.

Note:
Install fiber roll along a level contour.

Vertical spacing measured along the face of the slope varies between 10' and 20'

Install a fiber roll near slope where it transitions into a steeper slope

TYPICAL FIBER ROLL INSTALLATION
N.T.S.

ENTRENCHMENT DETAIL
N.T.S.

3/4" x 3/4" wood stakes
max 4' spacing

Fiber roll
8" min

2" min
max

Slope varies

12" min

September 2020
Napa County
LNU Lightning Complex 2020 BMPs
Based upon CASQA Construction BMP Online Handbook (2019)
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Typical Fiber Roll (Type 2) Installation
N.T.S

Fiber Roll (Type 2)
Adapted from
Caltrans SC-5
Factsheet
CTSW-RT-17-
314.18.1 May 2017