

Description and Purpose

A fiber roll (also known as a wattle or log) consists of straw, coir, curled wood fiber, or other biodegradable materials bound into a tight tubular roll wrapped by netting. 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 top, toe, and on the face of slopes along the contours, fiber rolls intercept runoff, reduce flow velocity, release runoff as sheet flow, and provide sediment removal 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 top, toe, 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

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category**
- Secondary Category**

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-12 Manufactured Linear Sediment Controls
- SE-13 Compost Socks and Berms
- SE-14 Biofilter Bags

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- At operational storm drains as a form of inlet protection.
- Around temporary stockpiles.

Limitations

- Fiber rolls are to be used in conjunction with erosion control, such as hydroseed, mulch, rolled erosion control products (RECPs), etc.
- Only biodegradable fiber rolls containing no plastic can remain on a site when applying for a Notice of Termination (NOT) due to plastic pollution and wildlife concerns. There may be further limitations on the use of plastic wrapped fiber rolls in wildlife sensitive areas. Fiber rolls containing plastic must be removed and disposed of prior to final stabilization.
- Do not install fiber rolls in high traffic areas where vehicles and equipment will displace or damage them.
- Do not use fiber rolls on paved surfaces where they cannot be staked and trenched in. Only gravel core rolls may be effective in this situation. See Gravel Bags (SE-6), Manufactured Linear Sediment Controls (SE-12), Compost Socks and Berms (SE-13), and Biofilter Bags (SE-14) for situations where staking or trenching is not possible.
- Do not use fiber rolls on slopes subject to creep, slumping, or landslides.
- Improper installation of a fiber roll such as not being trenched in, not staked appropriately, or not sufficiently overlapping at the ends, may cause undercutting and increased erosion.
- 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 concentrated flows.
- Not intended to contain stormwater. See Sediment Basin (SE-2) or Sediment Trap (SE-3) for stormwater containment BMPs.
- Difficult to move once saturated.
- Difficult to repair when a small section of the fiber roll is damaged. Replacement of the entire fiber roll or installation of an additional fiber roll adjacent to the damage is often required.
- Fiber rolls are susceptible to damage from wildlife.
- Fiber rolls have a limited sediment capture zone.
- Fiber rolls typically function for 12-24 months, depending upon local conditions, roll material, and installation method. For example, the Type 2 installation method may last longer than the Type 1 installation method because the fiber roll is not penetrated.

- Fiber rolls that come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll, are considered passive treatment technologies and are subject to additional requirements, see Passive Treatment (SE-15).

Implementation

Fiber Roll Materials

- Fiber rolls are to 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 wrap (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 diameter, the higher the sediment retention capacity.
- Typical fiber rolls lengths are 4, 10, 20 and 25 ft., although other lengths may be available.

Installation

- Locate fiber rolls on level contours spaced as follows:
 - Slope inclination between 20:1 and 4:1 -20 (H:V): Place fibers rolls at a maximum interval of 35 ft.
 - Slope inclination of 4:1 (H:V): Place fiber rolls at a maximum interval of 20 ft.
 - Slope inclination between 4:1 and 2:1 (H:V): Place fiber rolls at a maximum interval of 15 ft. (a closer spacing is more effective).
 - Slope inclination 2:1 (H:V) or greater: Place fiber rolls at a maximum interval of 10 ft. (a closer spacing is more effective).
- It is critical that fiber rolls are installed perpendicular to water flow and parallel to the slope contour.
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth is to be 1/4 to 1/3 of the thickness of the roll, and the width is to be equal to the roll diameter, in order to provide area to backfill the trench.
- Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- For Type 1 installations:
 - Place in a trench that is from 2 to 4 inches deep.
 - Fasten with wood stakes every 4 feet along the length of the fiber roll.
 - Fasten the ends of the fiber roll by placing a stake 6 inches from the end of the roll.

- Drive the stakes into the soil so the top of the stake is less than 2 inches above the top of the fiber roll.
- For Type 2 installations (Caltrans, 2024):
 - Trenching in the fiber rolls is optional.
 - J-hook the ends of the fiber roll up-slope to prevent runoff from going around the fiber roll.
 - Drive stakes along alternating sides of each fiber roll, spaced 2 ft. apart. Stakes are to alternate between upslope and downslope of the fiber roll.
 - Lace the rope tightly around the stakes and over the fiber roll. Knot the rope at each stake.
 - Tighten the fiber roll to the surface of the slope by driving the stakes further into the soil.
- If more than one fiber roll is placed in a row, the rolls should overlap, not abut at the ends. Stagger overlapping joints in adjacent rows by 5 to 10 feet.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or be removed depending on the type of fiber roll and its application (temporary vs. permanent installation).
- For temporary installations, only remove fiber rolls when upgradient areas are stabilized per General Permit requirements, and/or pollutant sources are no longer present. Remove fiber rolls before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.
- For permanent installations for final stabilization, fiber rolls encased with plastic netting or containing any plastic material are to be removed from the site. If a fiber roll is to be left in place as part of a final stabilization design, the fiber roll must be non-plastic, made of plant-based materials (e.g., burlap-wrapped, coconut jute netting, and any other plant-based netting), and fully biodegradable.
- Fiber rolls can be an effective component of a final stabilization system, if all components of the fiber rolls are plant-based, fully biodegradable, and the fiber rolls are coupled with fully biodegradable effective erosion control measures (hydroseeding, RECPs, etc.) properly applied/installed per manufacturer's specifications and/or per the current CASQA BMP Fact Sheets. Removal of fiber rolls that are used as part of a final stabilization system can result in greater disturbance; therefore, during the BMP planning phase, only specify fiber rolls wrapped in non-plastic fully biodegradable materials for areas where fiber rolls will be used on final slopes.

Inspection and Maintenance

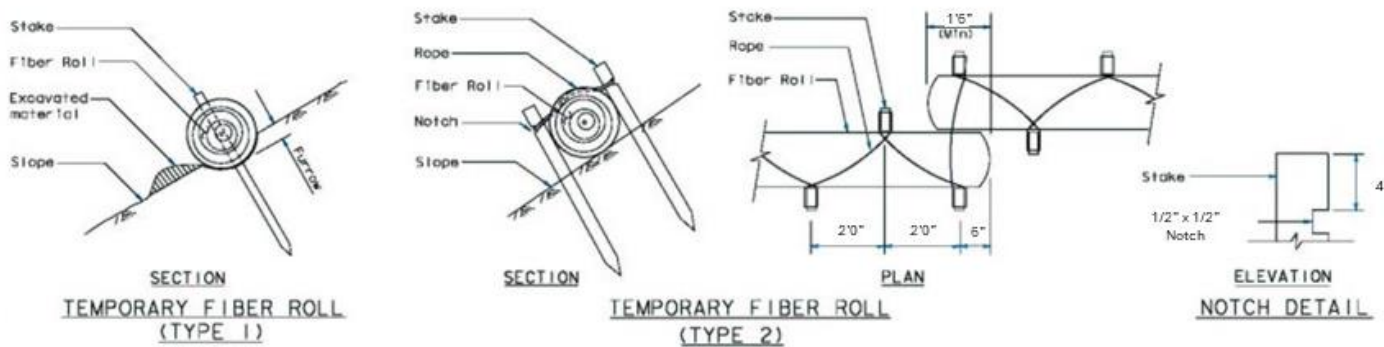
- BMPs are to be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that BMPs be inspected weekly at a minimum and prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair/replace split, torn, unraveling, or slumping fiber rolls as needed.
- Replace fiber rolls when they are disintegrated, flattened, and no longer effective.
- If construction activities or access to a work area are impaired by a fiber roll, move the fiber roll to avoid its damage or disintegration. Reinstall the fiber roll once active work is complete.
- If a fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, periodically remove sediment that accumulates upgradient of the fiber roll to maintain BMP effectiveness. Remove sediment when sediment accumulation reaches one-third of the height of the fiber roll.
- If fiber rolls are used for erosion control, such as in a check dam, sediment removal may not be required as long as the system continues to control the grade. Sediment control BMPs will be implemented in conjunction with this type of application.
- Repair any undercutting, rills, and gullies promptly.

References and Additional Resources

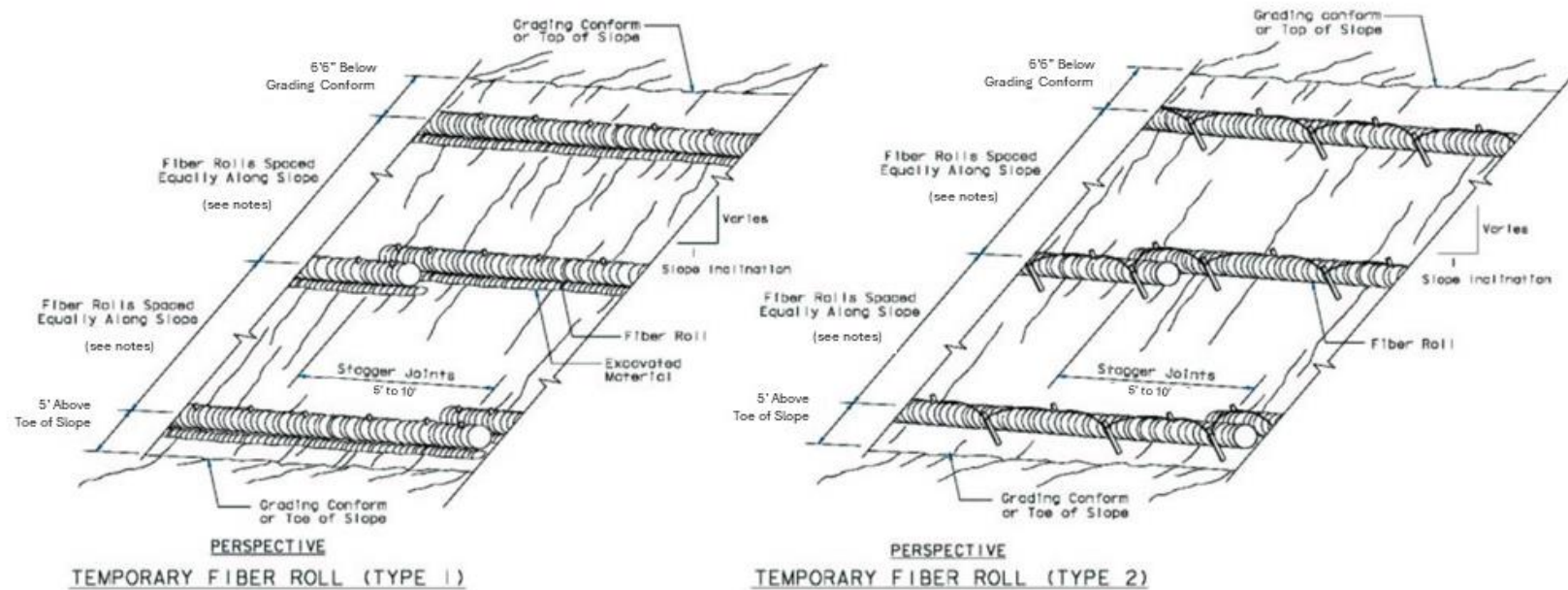
Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.

Construction Stormwater Program website, State Water Resources Control Board, online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html

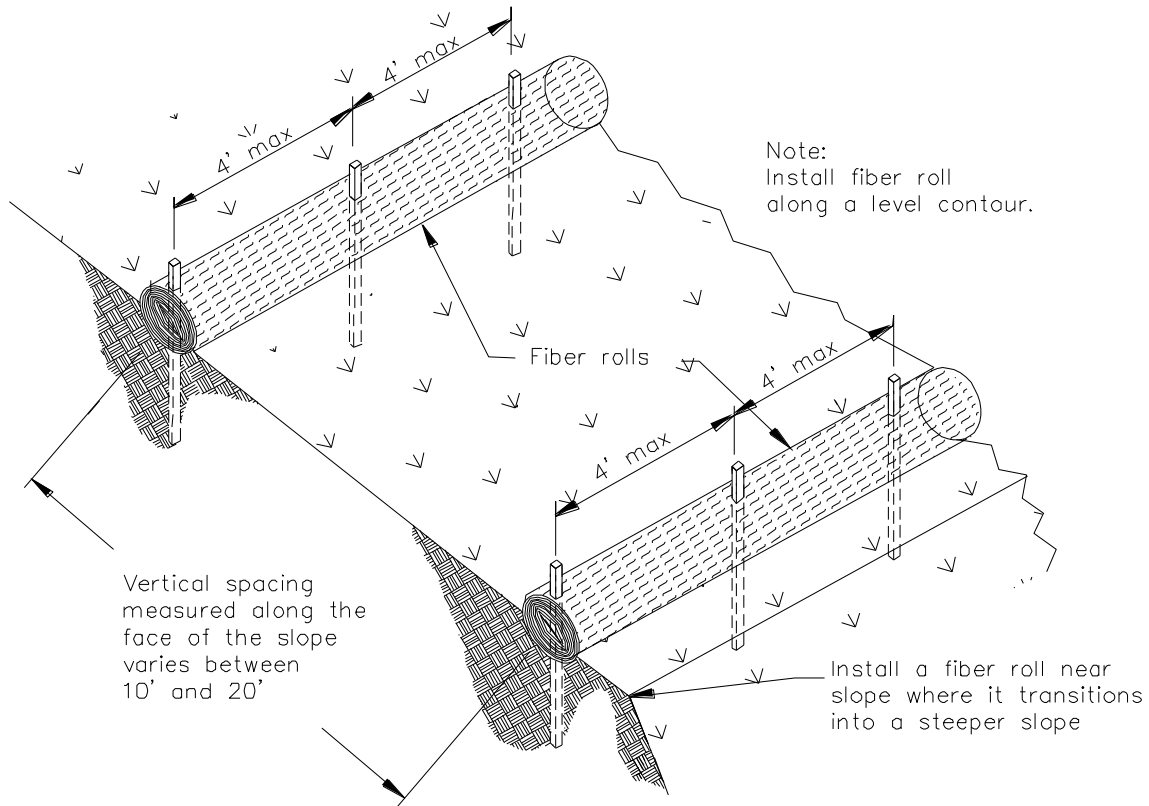
Order 2022-0057-DWQ, NPDES General Permit No. CAS000002: National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit), California State Water Resources Control Board (State Water Board), September 2022.



- NOTES**
1. Temporary fiber roll spacing varies depending upon slope inclination.
 2. Installations shown in the perspectives are for slope inclination of 10:1 and steeper.

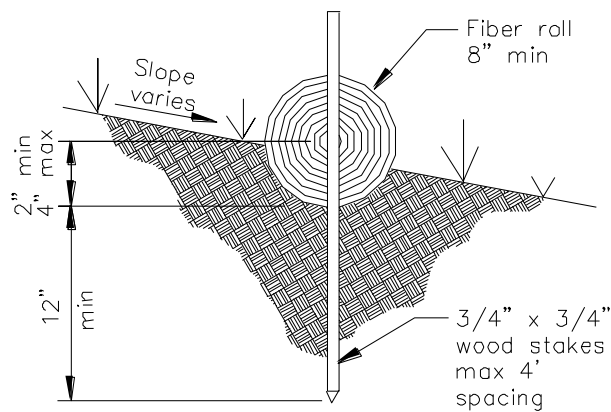


Reference: Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.



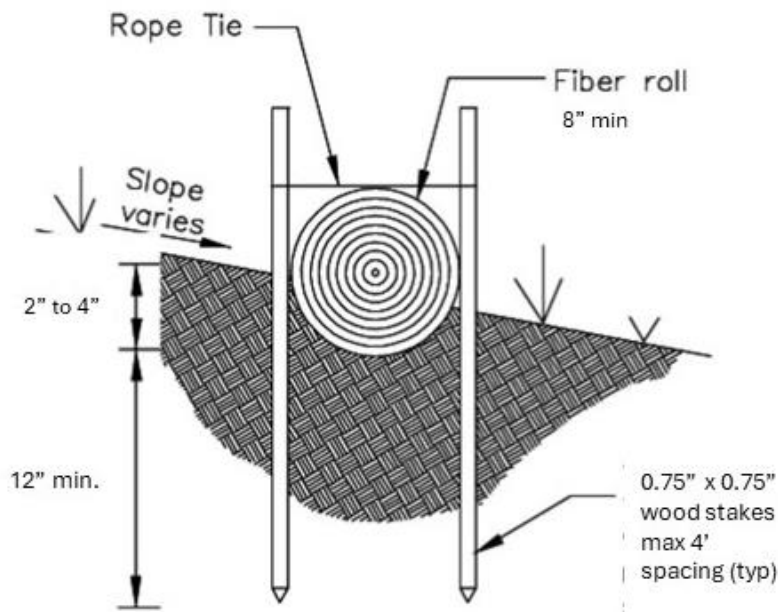
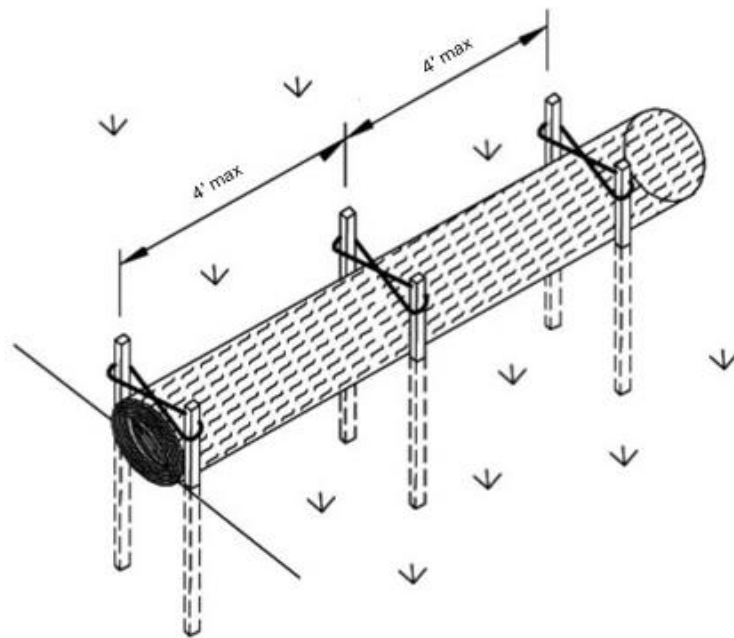
TYPICAL FIBER ROLL INSTALLATION

N.T.S.



ENTRENCHMENT DETAIL

N.T.S.



OPTIONAL ENTRENCHMENT DETAIL

N.T.S.

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