STANDARD AND SPECIFICATIONS
FOR
TREE REVETMENT

Definition
A tree revetment consists of a tree trunk and branches, without root wad, cabled to an earth anchor, which is buried in the streambank.

Purpose
To reduce streambank erosion by absorbing energy and reducing velocity, capturing sediment, and enhancing conditions for planting or colonization of native species.

Conditions Where Practice Applies
This practice is appropriate for streambanks that are eroded or undercut. It should not be used near bridges or other structures where there is a potential for downstream damage if a revetment dislodges. Their use should be limited to non-flashy streams where the needs for future maintenance are not important.

Design Criteria
1. Trees shall be sound, recently felled spruce or fir of 6" or greater diameter and at least 20 feet in length.

2. Trees are placed initially at the base flow elevation with the butt end upstream. Multiple tree revetments shall be overlapped by 25% of their length, working from downstream to upstream.

3. Each tree shall have their branches trimmed off on the bank side and have two anchors, one near the butt end and the other at 3/4 distance up the trunk.

4. The tree shall be fastened with galvanized cable to the anchors, which will be commercially manufactured earth anchoring systems. The butt end cable shall also be attached to the stem of the next tree at 3/4 the distance from the base, as it is placed to the outside of the previous tree.

5. Excavate and backfill as necessary to fit the tree revetment to the site.

Maintenance
Due to the susceptibility of plant materials to the physical constraints of the site, climate conditions, and animal populations, it is necessary to inspect installations frequently. This is especially important during the first year or two of establishment. Plant materials missing or damaged should be replaced as soon as possible. Sloughs or breaks in drainage pattern should be reestablished for the site as quickly as possible to maintain stability.
CONSTRUCTION SPECIFICATIONS

1. TREES SHALL BE STRUCTURALLY SOUND, RECENTLY FELLED CONIFERS OF 6” DIAMETER OR GREATER AND AT LEAST 20’ IN LENGTH.

2. TREES SHALL BE PLACED WITH THE BUTT END OF THE STEM PLACED UPSTREAM. TREES SHALL BE OVERLAPPED BY 25% OF THEIR LENGTH.

3. EACH TREE SHALL HAVE TWO GALVANIZED CABLES, THE FIRST ATTACHED NEAR THE BUTT END, THE SECOND AT 3/4-TRUNK WITH BOTH ATTACHED TO AN ANCHOR USING TWO GALVANIZED CLAMPS AT EACH CONNECTION.

4. THE ANCHORS SHALL BE COMMERCIAL MANUFACTURED EARTH ANCHORING SYSTEMS AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE ANCHORING SYSTEM SHALL BE INSTALLED AS PER THE MANUFACTURER’S SPECIFICATIONS.

5. GALVANIZED CABLES SHALL BE INSERTED THROUGH A DRILLED HOLE AND WRAPPED AT LEAST ONE AND ONE-HALF TIMES AROUND THE MAIN STEM OF THE TREE OR ANCHOR, THEN CLAMPED. SEE CONTRACT DOCUMENTS FOR CABLE SIZE.

ADAPTED FROM DETAILS PROVIDED BY USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

TREE REVETMENT
STANDARD AND SPECIFICATIONS
FOR
BRANCHPACKING

Definition

Branchpacking consists of alternate layers of live branch cuttings and tamped backfill to repair small, localized slumps and holes in slopes.

Purpose

The purpose of branchpacking is to provide repair to existing slopes that have small slips or slumps by filling in the failed area with plant materials and soil.

Conditions Where Practice Applies

This is an appropriate technique for repairing slip areas that do not exceed 4 feet deep or 6 feet wide. It should not be used as a slope stability measure if structural embankment support is needed.

Design Criteria

1. The live branch cuttings shall be 1/2 - 2 inches in diameter and long enough to touch the undisturbed soil at the back of the area to be repaired. They should extend 4 - 6 inches beyond the finished backfill grade.

2. Wooden posts should be used to secure the plant material in place. They should be 6 - 8 feet long and 3 - 4 inches in diameter. If lumber is used, it shall be a minimum standard two by four.

3. Wooden posts shall be driven vertically 3 feet deep and placed in a grid pattern 1 - 2 feet apart.

4. Beginning at the bottom of the slip area, 4 - 6 inch layers of live branch cuttings are placed in angled layers, 1.5 to 3 feet apart. Compacted moist soil is placed between the layers (see Figure 4.8).

Maintenance

Due to the susceptibility of plant materials to the physical constraints of the site, climate conditions, and animal populations, it is necessary to inspect installations frequently. This is especially important during the first year or two of establishment. Plant materials missing or damaged should be replaced as soon as possible. Sloughs or breaks in drainage pattern should be reestablished for the site as quickly as possible to maintain stability.
**CONSTRUCTION SPECIFICATIONS**

1. Starting at the lowest point drive the wooden posts vertically 3’ to 4’ into the ground. Set them 1’ to 1.5’ apart.

2. A layer of living branches 4’ to 6’ thick is placed in the bottom of the hole, between the vertical posts. They shall be placed in a crisscross configuration with the growing tips generally oriented toward the slope face. Some of the basal ends of the branches from each layer shall touch the back of the hole or slope.

3. Each layer of branches shall be installed with the basal ends lower than the growing tips of the branches.

4. The final installation shall match the existing slope. Branches should protrude only slightly from the filled face.

5. Each layer of branches shall be followed by a 1’ layer of soil hand tamped to ensure contact with the branch cuttings.

6. The soil shall be moist or moistened to ensure that live branches do not dry out.

7. Where specified, live stakes shall be used in place of posts.

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**ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE**
STANDARD AND SPECIFICATIONS
FOR FIBER ROLL

Definition
A fiber roll is a coir (coconut fiber), straw, or excelsior woven roll encased in netting of jute, nylon, or burlap.

Purpose
To dissipate energy along streambanks, channels, and bodies of water and reduce sheet flow on slopes.

Conditions Where Practice Applies
Fiber rolls are used where the water surface levels are relatively constant. Artificially controlled streams for hydropower are not good candidates for this technique. The rolls provide a good medium for the introduction of herbaceous vegetation. Planting in the fiber roll is appropriate where the roll will remain continuously wet.

Design Criteria
1. The roll is placed in a shallow trench dug below baseflow or in a 4 inch trench on the slope contour and anchored by 2” x 2”, 3-foot long posts driven on each side of the roll (see Figure 4.9).

2. The roll is contained by a 9-gauge non-galvanized wire placed over the roll from post to post. Braided nylon rope (1/8” thick) may be used.

3. The anchor posts shall be spaced laterally 4 feet on center on both sides of the roll, staggered, and driven down to the top of the roll.

4. Soil is placed behind the roll and planted with suitable herbaceous or woody vegetation. If the roll will be continuously saturated, wetland plants may be planted into voids created in the upper surface of the roll.

5. Where water levels may fall below the bottom edge of the roll, a brush layer of willow should be installed so as to lay across the top edge of the roll.

Maintenance
Due to the susceptibility of plant materials to the physical constraints of the site, climate conditions, and animal populations, it is necessary to inspect installations frequently. This is especially important during the first year or two of establishment. Plant materials missing or damaged should be replaced as soon as possible. Sloughs or breaks in drainage pattern should be reestablished for the site as quickly as possible to maintain stability.
Figure 4.9
Fiber Roll

CONSTRUCTION SPECIFICATIONS

1. Excavate a shallow trench slightly below baseflow or a 4" trench on slope contours.

2. Place the roll in the trench and anchor with 2" x 2" posts placed on both sides of the roll and spaced laterally on 2' to 4' centers. Trim the top of the posts even with the edge of the roll, if necessary.

3. Notch the posts and tie together, across the roll, with 9 gauge galvanized wire or 1/8" diameter braided nylon rope.

4. Place soil excavated from the trench behind the roll and hand tamp. Plant with suitable herbaceous or woody vegetation as specified elsewhere in the contract documents. Vegetation shall be placed immediately adjacent to the roll to promote root growth into the fiber. Herbaceous vegetation, if specified, shall be planted into the fiber roll.

Adapted from details provided by USDA - NRCS, New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Soil & Water Conservation Committee

FIBER ROLL
References


