



Designation: D 6599 – 00

Standard Practice for Construction of Live Fascines on Slopes¹

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1. Scope

1.1 This practice covers the material, fabrication and installation work to construct live fascines.

1.2 The values in this standard are in SI units and are to be regarded as the standard. The inch-pound units given in parentheses are for information only.

1.3 This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgement. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without considerations of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.

1.4 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Terminology

2.1 Definitions:

2.1.1 *live fascine, n*—a linear bundle of live cut branches of woody plant material that propagates easily from cuttings. The bundle is anchored in a shallow trench and partially covered with soil.

2.1.2 *rolled erosion control product, n*—a material manufactured into rolls designed to reduce erosion and assist in the germination, establishment and/or anchorage of vegetation.

2.1.3 *dead stout stake, n*—a wood stake approximately .75 to 1 m (2.5 to 3 ft) in length. Construct dead stout stakes from 3.8 × 8.9 cm (2" × 4") dimensional lumber cut diagonally along the 8.9 cm face.

2.1.4 *live stake, n*—a woody stem or branch of vegetatively self-propagating woody plant species. Live stakes are approximately 2.5 to 4 cm (.5" to 1.5") in diameter and 60 to 75 cm (24"–30") in length with the terminal end sharpened to a point or a steep angular cut. Use live stakes as additional anchors and propagating material on the downslope side of live fascine bundles.

3. Summary of Practice

3.1 A live fascine is comprised of live cut plant stems and branches, typically of woody plant species (e.g., willow, dogwood, poplar, etc.) that are formed into linear bundles. These bundles are installed in shallow trenches, secured in the trench with wood stakes, then backfilled with enough soil to leave a small portion on top of the branch bundle exposed. Live fascines assist to control erosion, encourage vegetative top growth establishment and rooting for shallow soil stabilization.

4. Significance and Use

4.1 Live fascines are used to provide erosion and sedimentation control by increasing infiltration, slowing or redirecting runoff, and trapping seed and sediments. The method provides shallow mechanical surface slope stabilization, and provides enhanced values through vegetative growth and additional shallow soil reinforcement through the development of the roots. The ability of live fascines to function properly depends on the quality and choice of the materials used to construct the live fascine, the means and methods of fabrication and installation, and proper consideration of site characteristics and time of year. For the live fascine to function completely, it is important that the live fascine develops suitable growth.

5. Materials

5.1 *Live Woody Plant Material*—are woody stems and branch cuttings of vegetatively self-propagating woody plant species.

When constructing a live fascine, use only fresh or well-preserved viable cuttings. Do not use dead plant material in live fascines. The stems or branches should be long, straight and flexible to allow easy assembly into bundles. Typically, plants are harvested near the project site within the same climatic zone. Cut the plant material in lengths ranging from 2 to 4 m (6' to 13'). Greater lengths may be used if handling and

¹ This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.25 on Erosion and Sediment Control Technology.

Current edition approved Nov.10,2000. Published March 2001.

site conditions allow. The caliper (diameter) of cuttings generally range from 1.2 to 2.5 cm (.5" to 1"). The greatest success results from cutting and installing vegetation during the dormant season.

5.2 Brush Cutting Implements—Cut live vegetation with tools such as pruning shears, loppers, clearing saws, chainsaws, or similar. Do not use axes or blunt implements.

5.3 Ties—Secure the bundle of live woody plant material with ties made from baling twine, rope, belts or nylon ties (e.g., electrical ties). Each tie should be long enough to reach around the bundle, and strong enough to keep the bundle secure.

5.4 Anchors—Wooden stakes (dead stout stakes) or metal rebar is used to anchor the live fascine in place.

6. Construction

6.1 Complete excavation and other earthwork before the live fascine construction begins. The finished slope surface should be approved prior to installing the live fascine. Excavate a shallow trench 15 to 20 cm (6" to 8") deep and wide at the appropriate location. In multiple row configurations excavate all additional trenches. The trench should be slightly shallower than the diameter of live woody plant material bundles. Temporarily stockpile excavated material on the uphill side of the trench. Any soil amendments, if needed, should be placed in the bottom and along the sides of the trench and mixed into the soil, before placing the live woody plant material bundles.

6.2 Harvest live woody plant material using a sharp, clean brush-cutting implement. The cuttings may be temporarily stored outdoors in water or in a moist environment for a maximum of 2 days when the outdoor temperature remains below 10°C (50°F), or refrigerated storage at 1°C–3°C (33°F–39°F) can be used for up to two (2) months, provided humidity levels are maintained above 90%.

6.3 Assemble the live woody plant material into bundles approximately 15 to 20 cm (6" to 8") in diameter. Stagger cuttings to maintain a reasonably uniform bundle diameter. Maintain live fascine uniformity by spacing bundle ties approximately .35 m (1') on center.

6.4 The installation of live woody plant material bundles normally begins at the bottom of the slope and proceeds upward, however alternate procedures may also be employed. To minimize live fascine damage while hand transporting them in place, use one person at approximately every 1.5 m (5') of the length to support the bundle.

6.5 Place the bundles in the trench and secure with the dead stout stake (or other inert anchoring device) driven vertically through the center of the bundles at 1 m (3') on center. The anchoring device is driven flush with the top of the live woody plant material bundles. Use extra stakes at connections and overlaps. If live stakes are added, install them on the downhill side of the live woody plant material bundle at the same spacing between the dead stout stakes. Remove and replace any live stakes that shatter or break during installation.

6.6 Backfill trench to accomplish good soil medium contact with the live fascine bundle. *Do not bury the entire bundle.* The live fascine must have some branches exposed at final grade. Work and tamp the soil through and along either side the live fascine bundle. If necessary, water trench and bundle to ensure soil migrates to voids within the fascine bundle.

6.7 To provide temporary erosion protection and to expedite germination and establishment of vegetation, seed, mulch and/or the use of rolled erosion control product may be used in conjunction with live fascines. Apply the seed in the area between the excavated trenches or alongside the live fascine. The seeded areas should be mulched with an appropriate cover. If using a rolled erosion control product, change the installation sequence as follows; excavate the trench and stockpile soil, seed and fertilize between trench rows, install rolled erosion control product (lined trenches will act as a key for the blanket), install live fascine and backfill trench/bundle (see 6.6). Do not seed on top of the rolled erosion control product unless specified by manufacturer.

7. Keywords

7.1 erosion control; live fascine; soil bioengineering; slope stabilization



FIG. 1 Photograph of Live Fascine Fabrication (Tied Bundles, Not Installed)