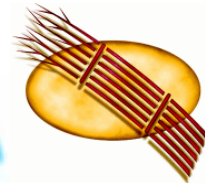


Fascines



Description

Fascines can be best described as a rope-shaped bundle of live cuttings, lashed together with twine. Fascines have many other names including brush wattles, faggots, wattles, wattling bundles, and live fascines. Fascines grow rapidly when constructed from live materials. The resulting root systems work well to secure soils and to hold the fascine in place. They are simple and effective, require little time to build and can be installed with little site disturbance.

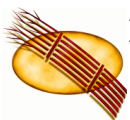
Purpose

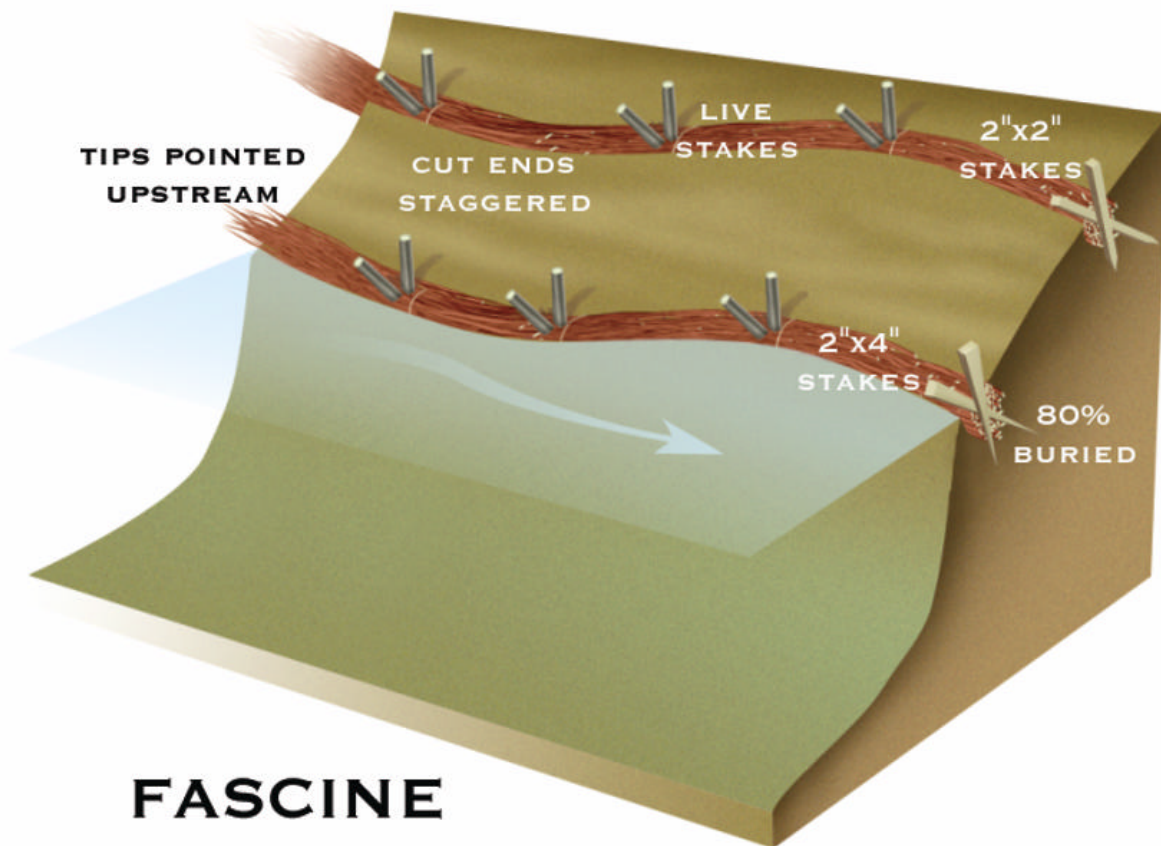
Fascines can be used to perform a wide variety of functions. They can be used on their own to provide erosion protection on small streams, and to bench eroded slopes or gullies. They are very effective in preventing surface erosion. They can also be used in conjunction with many other soil bioengineering techniques, habitat improvement measures or conventional methods of erosion control. Structurally, fascines can provide immediate protection once installed. This feature is enhanced once the fascine begins to grow.

Application

When used on their own as a streambank erosion control measure, fascines are placed in a shallow trench excavated at the waters edge, typically along the outside bends of small streams. Fascines can be used to stabilize slopes where the toe or base of the slope is stable or protected. In this case the fascines would be installed across the slope to reduce runoff and trap sediment. Fascines can also be used as drains to conduct runoff or bank seeps.

When used on stream banks, fascines should be restricted to sites that are experiencing surface erosion (shallow sloughing of soil) **NOT** mass wasting (mass wasting is when large, deep sections of a slope shift, or fail at the same time). Nor should they be used in situations where they would experience rapid undercutting, such as along the outside bends of deep pools cut into soils that are highly erosive. This method is best suited to small streams less than 5 metres wide with bank heights less than 1.5 metres. Fascines in this function can be used in most channel types. In conjunction with other methods, fascines can be used to protect the toe of brush mattresses, and the top leading edge of cribwalls. They can also be used to "soften" existing rock rip-rap, gabion baskets, or concrete blocks, by placing them along the top edge of the stone, or if possible, along the waters edge.

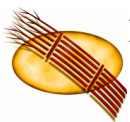




Construction Guidelines

Make sure the toe is stable when using fascines on slopes. If the toe is not stable, erosion can move up the slope, undermining the fascines and causing failure. Should the toe be experiencing erosion, you will need to remedy the situation by using one of the other appropriate methods in this manual. Once this has been addressed, you can then place the fascines on the slope. The following steps should be followed when placing fascines on slopes:

- install the first fascine at the bottom of the slope.
- move upslope, placing fascines using the recommended spacing of 1 metre for 1:1 slopes (height:vertical), 1.5 metre for 2:1, 2 metres for 3:1, and 3 metres for 4:1 slopes.
- on dry slopes fascines can be placed level or on contour.
- on wet slopes fascines can be placed on slight angles to facilitate drainage of runoff.
- place long straw on the slope between fascines (on slopes 1.5:1 or flatter), steeper



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slopes would require the use of an erosion control fabric. This fabric would be anchored in place by tucking the leading edge into the trench, and staking the fascine on top.

To build a fascine:

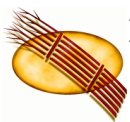
1. Harvest and stockpile an assortment (being different species, ages and lengths) of live, dormant cuttings. Fascines can be built from a wide range of cuttings, but are best built from slim relatively unbranched cuttings (coppice) because they are the easiest to work with and produce the densest fascines. If the cuttings have multiple, hard to bend side branches, prune them, being sure to use the trimmings
2. Fascines are easier to build in a set of saw horses. Lay the cuttings on the sawhorses, with the growing tips facing in the same direction, and with the cut ends staggered throughout.
3. Tightly tie the fascines together tight with rope or twine. The distance between ties can vary. You should be able to carry, bend, and not be able to pull apart, a properly tied fascine. If your first attempt fails, make sure the cut ends are staggered, and that the ties are tight, and frequent. Fascines can be constructed in varying lengths and diameters, but work best if they are tied so they are dense.

To install a fascine:

1. Dig a shallow trench, slightly less wide and deep than the diameter of the fascine. The fascine should be approximately 20% exposed once installed.
2. Place the fascine in the trench, and stake into place. The growing tips should point upstream, or if placed on angles on slopes, pointed uphill. There are several methods of staking. Livestakes are recommended as they will grow, providing extra strength in the long run for the structure. In compact soils such as clays and clay/shales, UNTREATED 2"x2" stakes, or 2"x4"s cut on a diagonal work well. Place the stakes every 1-1.5 metres. You should not be able to lift the fascine out of the trench.
3. Care should be taken to make sure the upstream end of the fascine is "returned" to the streambank. This means tucking the upstream end into the bank, and staking it securely so that the current cannot dislodge it. If the upstream end of the fascine is pulled away the entire structure could fail.
4. Bury the fascine by placing soil around and on top of it, tamping gently into place. Make sure you fill in all of the air spaces. Large air spaces around the fascine should be avoided, as they will promote desiccation of the live material.

Materials

- rope or twine, strong enough to tie the fascines together, and resilient enough to



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last 1 year. Hemp rope, heavy bailer twine, or plastic utility cord are good examples.

- ample quantities of live cuttings, for example a 4 m long fascine 25 cm in diameter will use approximately 5 bundles of cuttings (bundles being 20-30 cm in diameter, and 2 m long). Fascines should be constructed with a minimum of 2 different species. This will optimize the chances of successful growth.

Recommended species:

Small streams - Heartleaf willow, Sandbar willow, Shining willow, Pussy willow, all of the dogwoods.

Large streams - Black willow, Peachleaf willow, Pussy willow, Sandbar willow, Heartleaf willow, Carolina poplar, Balsam poplar, all of the dogwoods.

- shovels, rakes, deadblow and sledge hammers, pruning shears, utility knife, sawhorses.
- stakes, depending upon the application, from live stakes, to untreated 2"x2"s, to 2"x4"s cut into wedges.
- straw (for mulching on slopes), or an erosion control blanket (jute, coir, or a straw mix).

Cost and Maintenance Needs

Fascines cost very little, especially if the live materials are cut for free. Costs can be reduced even further if livestakes are used to anchor the fascine. The main expense is the time required to harvest live cuttings, transport them, and construct the fascines. Time required to install varies from 0.5 - 1 hour per linear metre. Fascines should be inspected periodically in the first year. Once the fascine is growing, they require little maintenance.

Integration

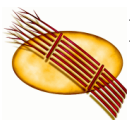
Fascines can be easily integrated into many types of projects such as:

- brush mattresses
- live crib walls
- log/brush shelters
- rock rip-rap
- joint planting
- native material revetment

Demonstrations

This type of habitat structure has been applied in the following demonstration projects:

- Project #15, Black Ash Creek Rehabilitation Project
- Project #24, Brault Property



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- Project #42, Soper Park - Mill Creek
- Project #44, Strausberg Creek
- Project #46, Kolb Creek
- Project #47, Schneider Creek
- Project #50, Colonial Creek
- Project #51, Bechtel Park
- Project #64, Highland Creek Rehabilitation Project
- Project #91, Tioga Wildlife Area - Pine River
- Project #93, Glen Huron
- Project #94, Martin Property - MacIntyre Creek
- Project #100, Scott's Plains Park
- Project #113, Harvey Brown's
- Project #114, Curcio's Bypass
- Project #115, Dixon Hill Tributary
- Project #117, Harding Property
- Project #121, Christian Blind Mission

For more information

Please refer to the following authors and their respective publications located in the bibliography:

Gray and Sotir, 1996

Schiechtl and Stern, 1996

210-EFH, 1992

