

Straw Bale Check Dam

What is a Straw Bale Check Dam?

These are temporary sediment barriers constructed of straw bales across very small drainages.

When is a Straw Bale Check Dam Used?

These temporary structures are used to slow debris flow. They are not intended to provide protection from large storm events or to control debris flows in water bodies such as creeks, streams and rivers. Straw bale check dam design limits are as follows:

Straw Bale Check Dam Design Limits		
Slope	Maximum Drainage Area Between Check Dams	Maximum Slope Length
0-15%	1 acre	200 feet
15-20%	1/2 acre	100 feet
>20%	NOT recommended	

How are Straw Bale Check Dams Installed?

Bales should be bound with wire or polypropylene twine. Bales bound with sisal twine are less durable. The bales should be placed in rows with bale ends tightly abutting the adjacent bales.

Downstream Row

(Refer to Illustrations 1 and 2) Dig a trench across the small channel, wide enough and deep enough so that the top of the row of bales placed on their long, wide side is level with the ground. The tops of bales across the center of the channel should all be level and set at the same elevation. Place the bales in position and stake them according to the instructions below.

Upstream Row

Dig another trench across the small channel, upstream and immediately adjacent to the first row of bales. The trench should be wide enough to accommodate a row of bales set vertically on their long edge. The trench should be deep enough so that at least six inches of each bale is below ground, starting with the bale in the center of the channel bottom. The trench should be as level as possible so that the tops of the bales across the center of the channel are level and water can flow evenly across them. Continue this trench up the side slopes of the small

channel to a point where the unburied bottom line of the highest bale (point "C" on Illustration 3) is higher than the top of the bales that are in the center of the channel (point "D" on Illustration 3).

Anchorage

Drive two-inch by two-inch stakes or number 4 rebar through the bales and into the ground 18 to 24 inches for anchorage. The first stake in each bale should be driven toward a previously laid bale to force the bales together (see Illustration 3).

What Maintenance is Needed?

Inspect the bale check dam and provide necessary maintenance following each storm period. Remove the bales, stakes, and wire or twines once permanent drainage and stabilization is reestablished. Used straw can be used as mulch in other areas.

Illustration 1: Top View

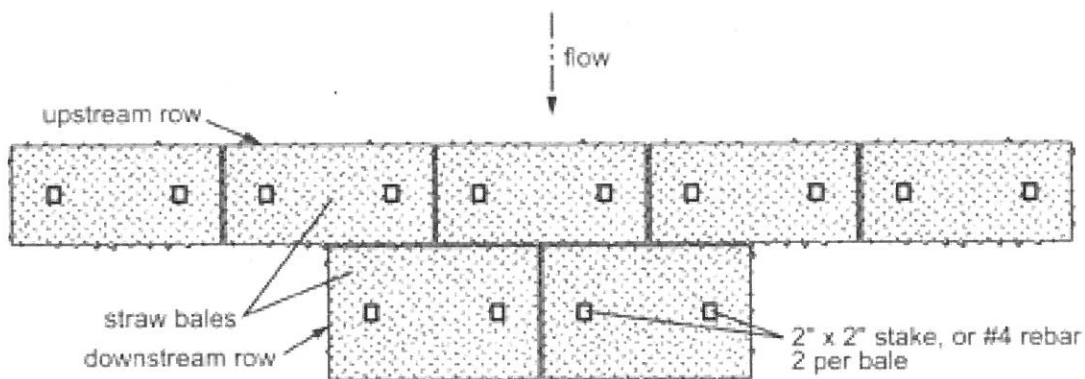


Illustration 2: End View

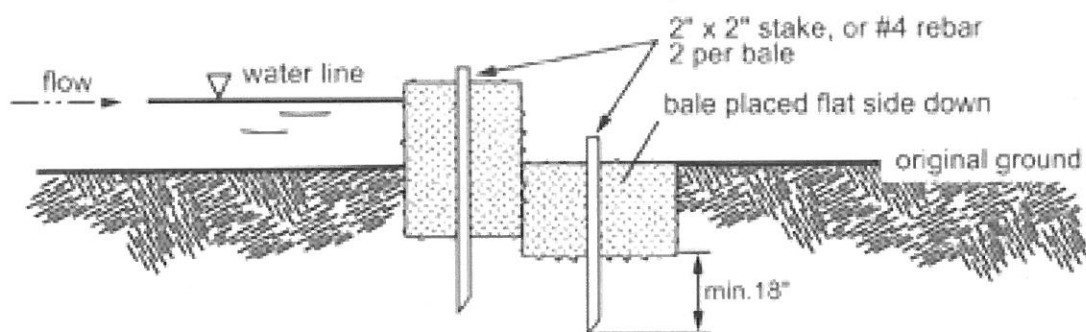
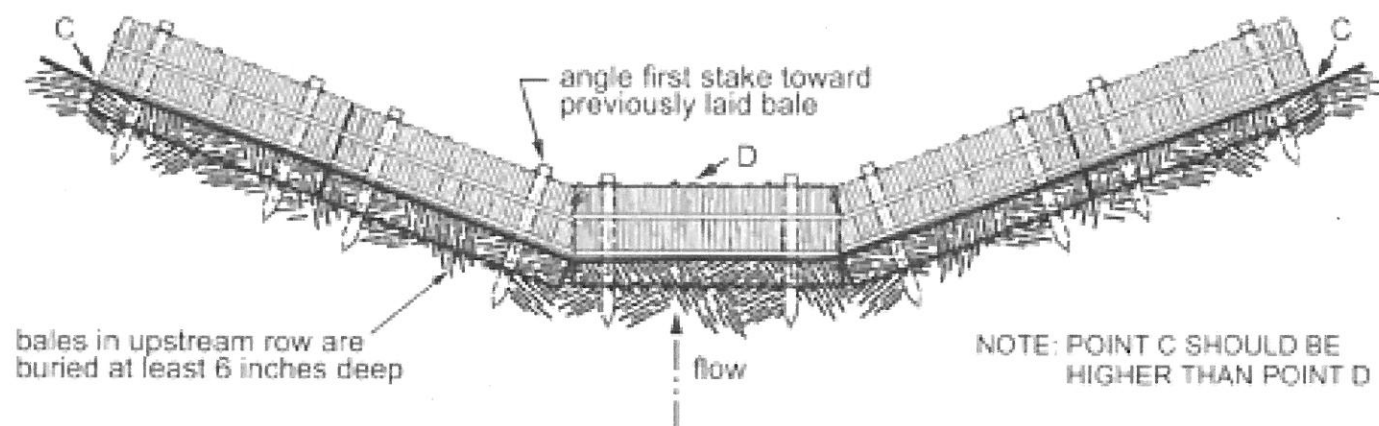


Illustration 3: Upstream View



STRAW BALE DIKES

Straw bale dikes are a temporary sediment barrier constructed of straw bales located downslope of a disturbed area or around a storm drainage outlet to redirect debris flows or trap debris materials.

They are usually installed in areas requiring protection from sedimentation expected from predicted rainfall events that will cause erosion.

They are intended to provide protection for a limited time, usually less than 3 months.

Installation Tips

Drainage area limits:

- **0-15% slope:** Maximum drainage area is 1 acre and maximum slope length is 200 feet.
- **More than 15% slope:** Maximum drainage area is ½ acre, maximum slope length is 100 feet.

Bind bales with wire or nylon twine (jute twine-bound bales are less durable). Bales should be made from clean weed free straw. Place bales in a row with ends tightly abutting adjacent bales. Do not place bales with wire or twine touching—see illustration. Compress some loose straw between adjacent bales to close voids. The tops of bales should all be level and set at the same direction.

Staking

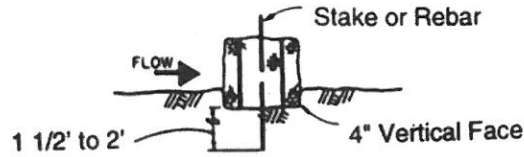
Each bale should be embedded in the soil a minimum of 4 inches. Drive 2x2 stakes or rebar through the bales and into the ground 1.5 to 2 feet for anchorage. The first stake in each bale should be driven toward a previously laid bale to force the bales together—see illustration.

Maintenance

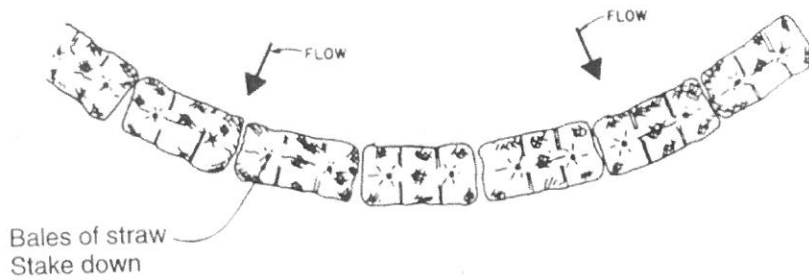
Inspect dikes and provide necessary maintenance following each storm event. It is important to ensure that loose straw does not enter storm drain facilities. Remove bales once permanent drainage and stabilization are re-established. Use the straw as mulch in other areas.

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Straw Bale Dikes



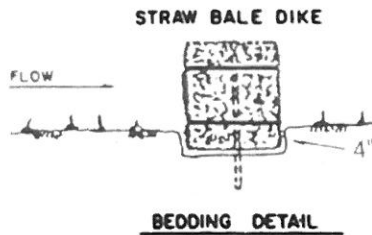
EMBEDDING DETAIL
N.T.S.



PLAN
N.T.S.

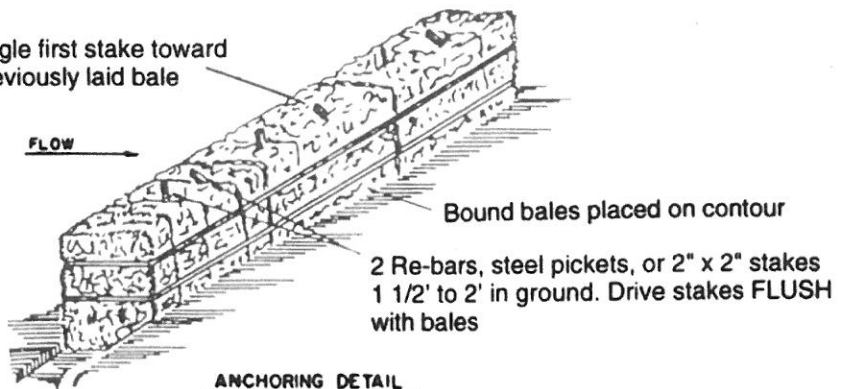


ELEVATION
N.T.S.



BEDDING DETAIL

Angle first stake toward
previously laid bale



ANCHORING DETAIL

STRAW MULCHING

What is it?

The application of straw as a protective cover over seeded areas to reduce erosion and aid in revegetation or over bare soils that will be landscaped later to reduce erosion.

When is it used?

This method is used on slopes which have been seeded and have high potential for erosion. It requires some type of anchoring by matting, crimping or other methods to prevent blowing or washing away.

Straw mulch forms a loose layer when applied over a loose soil surface. To protect the mulch from wind drifting and being moved by water, it must be covered with a netting such as plastic or punched into the soil with a spade or roller, or by spraying it with a tacking agent. The mulch should cover the entire seed or bare area. The mulch should extend into existing vegetation or be stabilized on all sides to prevent wind or water damage which may start at the edges.

Methods and Materials:

On gentle to moderate slopes, straw mulch can be applied by hand broadcasting to a uniform depth of 2 - 3 inches. On steep slopes, the straw should be blown onto the slope to achieve the same degree of cover. When applied properly, approximately 20-40 percent of the original ground surface can be seen. The application rate per acre should be about 2 tons (or one 74 pound bale per 800 square feet). Straw should be clean rice, barley, or wheat straw.

Anchoring of straw mulch can be accomplished using the following methods:

Hand Punching:

A spade or shovel is used to punch straw into the slope until all areas have straw standing perpendicularly to the slope and embedded at least 4 inches into the slope. It should be punched about 12 inches apart.

Roller Punching:

A roller equipped with straight studs not less than 6 inches long, from 4 - 6 inches wide and approximately one inch thick is rolled over the slope.

Crimper Punching:

Like roller punching, the crimper has serrated disk blades about 4 - 8 inches apart which force straw mulch into the soil. Crimping should be done in two directions with the final pass across the slope.

Matting:

Matting is used on large, steep areas which cannot be punched with a roller or by hand. Jute, wood excelsior or plastic netting is applied over unpunched straw.

Where to Get Help:

Technical Assistance is available from your local USDA Natural Resources Conservation Service office or your local Resource Conservation District regarding this practice and other treatments.

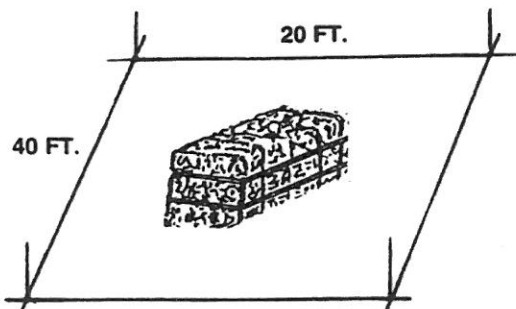
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Straw Mulching

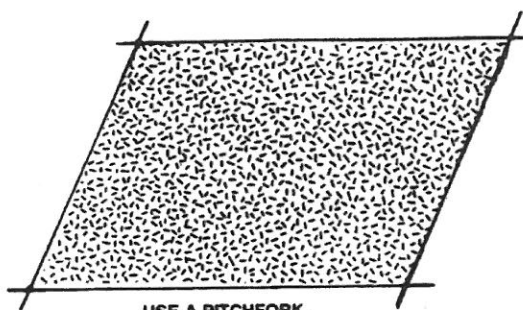
SPREAD THE STRAW

MARK OFF 800 SQ. FT. PLOTS

SPREAD EVENLY



PLACE ONE STRAW BALE PER PLOT (~74 POUNDS). THIS IS EQUIVALENT TO 2 TONS PER ACRE.



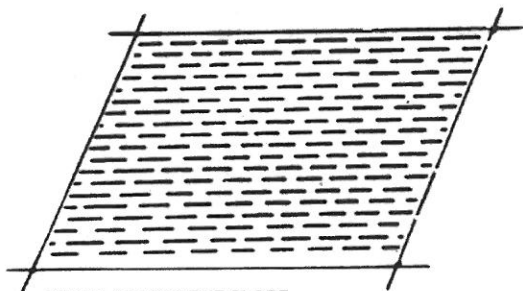
USE A PITCHFORK, SPADING FORK, OR BY HAND

ANCHOR THE STRAW

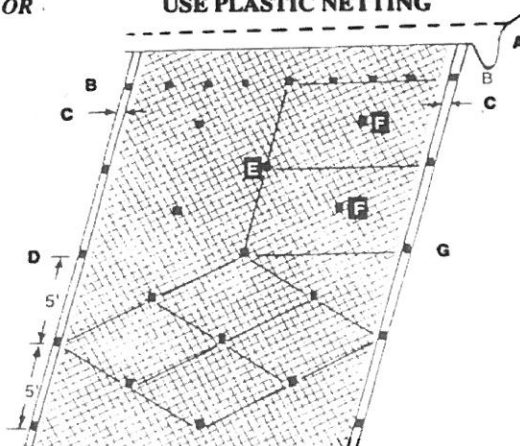
CRIMP BY HAND

OR

USE PLASTIC NETTING



WORK ACROSS THE SLOPE. PUNCH STRAW 4 INCHES DEEP. A SQUARE END SPADE WORKS WELL. MAKE PUNCH EVERY 12 INCHES.



Construction Notes

1. Lay matting in strips down the slope over the straw. Bury upper end in 6-8 inch deep and wide trench. Most netting comes in 14-17 feet wide rolls.
2. Secure the upper end with stakes every 2 feet.
3. Overlap seams on each side 4-5 inches.
4. Secure seams with stakes every 5 feet.
5. Stake down the center every 5 feet.
6. Stake middles to create diamond pattern that provides stakes spaced 4-5 feet apart.
7. Use pointed 1x2 inch stakes 8-9 inches long. Leave 1-2 inch top above netting or use "U" shaped metal pins at least 9 inches long.
8. When joining 2 strips, overlap upper strip 3 feet over lower strip and secure with stakes every 2 feet like in "B" above.

Fire Related Hydrophobic Soils

Definition

Wildfires burn vegetation that accumulates on the soil surface. This burning produces volatile hydrophobic substances which can penetrate the soil up to a depth of 6 inches. When these substances penetrate the cool soil, they condense and coat the soil particles, making the soil hydrophobic or water repellent.

Soils that are water repellent exhibit a decreased water infiltration rate and an increased water runoff rate, creating extreme soil erosion potential.

Initially, rain or irrigation water will run off hydrophobic soils instead of infiltrating and promoting germination of seed and growth of roots. This makes it difficult to establish new vegetation. Water repellency will be worst where fuel and burn temperatures were extreme, especially under trees, shrubs, and around building that burned to the ground.

Field Check

Field check for water repellent soil conditions by digging a shallow trench with a vertical wall and applying water droplets.

- If water sits as a ball on the soil for 10-40 seconds, it is moderately hydrophobic.
- If water sits as a ball for more than 40 seconds, it is strongly hydrophobic.

Treatment

On gentle slopes, work the soil a few inches deep to break up the layer. This will allow the water to penetrate the soil surface.

On steeper slopes, lightly spray the soil surface with a soil wetting product (surfactant). This will break up the hydrophobic substances and allow the water to infiltrate.