

Chapter 4 - BEST MANAGEMENT PRACTICE STANDARDS

STRAW BALE BARRIER

(Temporary Practice)

Definition

A temporary sediment barrier consisting of a row of entrenched and anchored straw rice or wheat bales.

Purposes

To intercept and detain small amounts of sediment from disturbed areas of limited extent in order to prevent sediment from leaving the site. To decrease the velocity of sheet flows and low-to-moderate level channel flows.

Conditions Where Practice Applies

Below disturbed areas subject to sheet and rill erosion where the size of the drainage area is no greater than 1/8 acre per 100 feet of barrier length and the maximum slope gradient behind the barrier is 3:1.

It is not recommended to use a straw bale barrier across a swale or ditch. Usually a silt fence or other BMP would better address erosion and sediment problems.

Where effectiveness is required for less than 3 months.

Under no circumstances should straw bale barriers be constructed in live streams or in swales where there is the possibility of a washout.

Planning Considerations

Improper use of straw bale barriers has been a major problem. Straw bale barriers have been used in streams and drainageways where high water velocities and volumes have destroyed or impaired their effectiveness. Improper placement and installation of the barriers, such as staking the bales directly to the ground with no soil seal or entrenchment has allowed undercutting and end flow. This has resulted in additions instead of removal of sediment from runoff waters. Finally, inadequate maintenance lowers the effectiveness of these barriers. Trapping efficiencies of carefully installed straw bale barriers on one project in Virginia dropped from 57 percent to 16 percent in one month due to lack of maintenance.

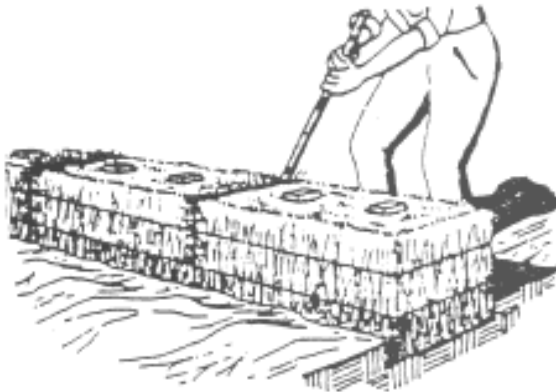
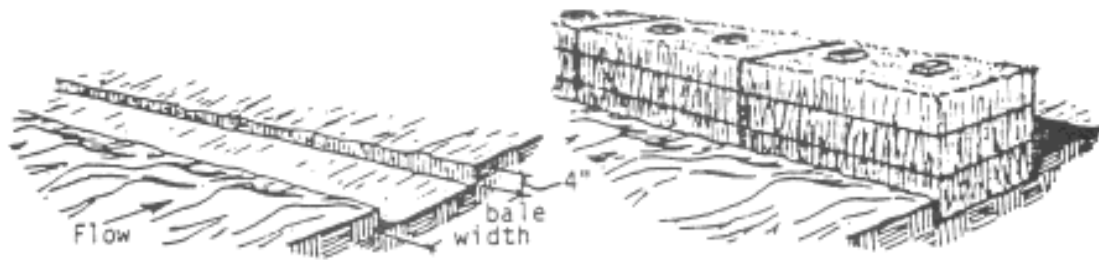
There are serious questions about the continued use of straw bale barriers as they are presently installed and maintained. However, if correct procedures are carefully followed, straw bale barriers can be quite effective.

Design Criteria

A formal design is not required.

1. Excavate the trench.

2. Place and stake straw bales.



3. Wedge loose straw between bales.



4. Backfill and compact the excavated soil.

CONSTRUCTION OF A STRAW BALE BARRIER



Points A should be higher than point B

PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE WAY

Plans and Specifications

Plans for constructing and installing the straw bale barrier shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve the intended purpose.

Specifications for installing the straw bale barrier shall use or be in conformance with the following. Any variation from these specifications shall be approved by an engineer.

1. Sheet Flow Applications

Bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another.

All bales shall be either wire-bound or string-tied. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales (in order to prevent deterioration of the bindings).

The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked, the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side of the barrier.

Each bale shall be securely anchored by at least two stakes or rebars driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or rebars shall be driven deep enough into the ground to securely anchor the bales.

The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between the bales. (Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency).

Straw bale barriers shall be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

2. Channel Flow Applications

Bales shall be placed in a single row, lengthwise, oriented perpendicular to the channel, with ends of adjacent bales tightly abutting one another.

The remaining steps for installing a straw bale barrier for sheet flow applications apply here, with the following addition. The barrier shall be extended to such a length that the bottoms of the end bales

are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the barrier but not around it.

3. Maintenance

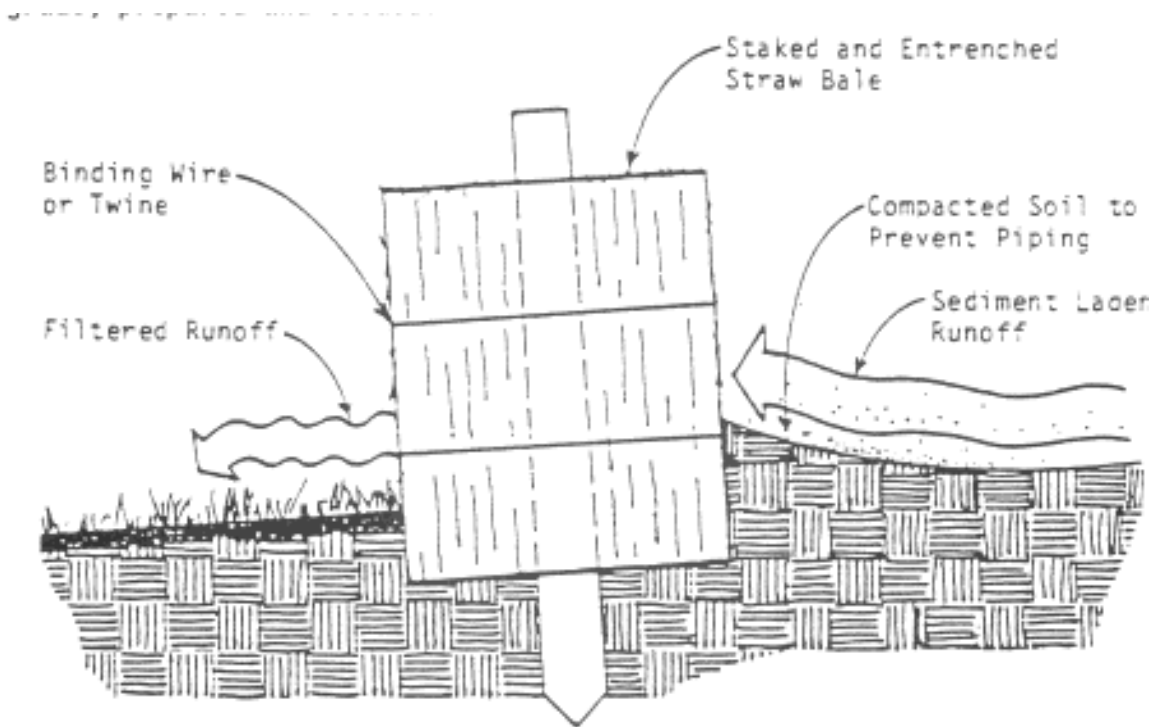
Straw bale barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.

Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales.

Necessary repairs to barriers or replacement of bales shall be accomplished promptly.

Sediment deposits should be removed after each rainfall. They must be removed when the level of deposition reaches approximately one-half the height of the barrier.

Any sediment deposits remaining in place after the straw bale barrier is no longer required shall be dressed to conform to the existing grade, prepared and seeded.



CROSS-SECTION OF A PROPERLY INSTALLED STRAW BALE