NATURAL RESOURCES CONSERVATION SERVICE
ILLINOIS URBAN MANUAL
PRACTICE STANDARD

MULCHING

(acre or sq.ft.)
CODE 875

(Source: IN Handbook for Erosion Control in Developing Areas)

DEFINITION

The application of plant residues and other suitable materials to the soil surface.

PURPOSE

The purposes of this practice are as follows:

1. To prevent erosion and prevent surface compaction or crusting by protecting the soil surface from raindrop impact and reducing the velocity of overland flow.
2. To foster the growth of vegetation by conserving available moisture and providing insulation against extreme heat and cold.
3. To improve the aesthetics of the site.
4. To control weeds.

CONDITIONS WHERE PRACTICE APPLIES

Temporary Mulches:

1. Areas that have been seeded to provide a temporary or permanent seeding.
2. Areas that cannot be seeded because of the season of the year and need for soil surface protection.
3. For mud and dust control.
4. Provide protection during periods when construction or seeding cannot be done.

Permanent Mulches:

1. Used together with planting trees, shrubs, and other ground covers that do not provide adequate soil stabilization.
2. Used in lieu of vegetative planting for ornamental reasons or because the site is not suitable for vegetation.

CRITERIA

1. The choice of materials will be based on the type of soil to be protected, season and economics.
2. Prior to Application
   a. Shape and grade, as required, the waterway, channel, slope, or other area to be protected.

b. Remove all rocks, clods, or debris larger than 2 inches in. diameter that will prevent contact between the mulch and the soil surface.
c. When open-weave nets are used, lime, fertilizer, and seed may be applied either before or after laying the net. When excelsior matting is used, these materials must be applied before the mat is laid.

3. Time of Application
   a. Immediately after seeding or planting by conventional method or hydroseeding. Can be applied with seeding as hydromulching.
   b. Immediately after seedbed preparation when dormant seedings are to be made by seeding over the mulch.
   c. When temporary erosion control is to be attained, mulch may be applied any time soil and site conditions are suitable for spreading and anchoring.
4. Application - Mulch materials shall be spread uniformly, by hand or machine. When spreading straw mulch by hand, divide the area to be mulched into approximately 1,000 sq. ft. sections and place approximately 90 lbs. of straw in each section to facilitate uniform distribution.
5. Mulch Anchoring - Straw mulch shall be anchored immediately after spreading to prevent wind blow. One of the following methods of anchoring straw shall be used:
   a. Mulch anchoring tool - This is a tractor-drawn implement (mulch crimper, serrated straight disk, or dull farm disk) designed to punch mulch approximately 2 inches into the soil surface. This method provides maximum erosion control with straw. It is limited to use on slopes no steeper than 3:1, where equipment can operate safely. Machinery shall be operated on the contour.
   b. Liquid mulch binders - Application of liquid mulch binders and tackifiers should be heaviest at edges of areas and at crests of ridges and banks, to prevent wind blow. The remainder of the area should have binder applied uniformly. Binders may be applied after mulch is spread; however, it is recommended sprayed into the mulch as it is being blown onto the soil. Applying straw and binder together is the most effective method.

      The following types of binders may be used:
      i. Asphalt - Any type of asphalt thin enough to be blown from spray equipment is satisfactory. Recommended for use are rapid curing (RC-70, RC-250, RC-800), medium curing (MC-250, MC-800) and emulsified asphalt (SS-1, MS-2, RS-1, and RS-2).
      ii. Synthetic Binders - Chemical binders may be used as recommended by the manufacturer to anchor mulch. These are expensive, and therefore, usually used in small areas or in residential areas where asphalt may be a problem.
      iii. Wood Fiber - Wood fiber hydroseeder slurries may be used to tack straw mulch.

This combination treatment is well suited to steep slopes, critical areas, and severe climate conditions.

c. Mulch nettings - Lightweight, degradable, plastic, polyester, or paper nets may be stapled over the mulch according to manufacturer's recommendations.
d. Peg and twine - Because it is labor-intensive, this method is feasible only in small areas where other methods cannot be used. Drive 8 to 10-inch wooden pegs to within 3 inches of the soil surface, every 4 feet in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square pattern. Turn twine 2 or more times around each peg.

Chemical Mulches - Chemical mulches may be used alone only in the following situations:

1. Where no other mulching material is available.
2. In conjunction with temporary seeding during the times when mulch is not required for that practice.

Note: Chemical mulches may be used to bind other mulches or with wood fiber in a hydroseeded slurry at any time. Manufacturer's recommendations for application of chemical mulches shall be followed.

Nets and Mats - Nets may be used alone on level areas, on slopes no steeper than 3:1, and in waterways.

When mulching is done in late fall or during June, July, and August, or where soil is highly erodible, nets should only be used in conjunction with an organic mulch such as straw.

When nets and organic mulch are used together, the net should be installed over the mulch except when the mulch is wood fiber. Wood fiber may be sprayed on top of the installed net.

Excelsior blankets are considered protective mulches and may be used alone on erodible soils and during all times of year.

Other products designed to control erosion shall conform to manufacturer's specification and should be applied in accordance with manufacturer's instructions provided those instructions are at least as stringent as this specification.

Laying the Net:

1. Start laying net from top of channel or top of slope and unroll downgrade. Always lay netting in the direction of water flow.
2. Allow to lie loosely on soil - do not stretch.
3. To secure net: Upslope ends of net should be buried in a slot or trench no less than 6 inches deep. Tamp earth firmly over net. Staple the net every 12 inches across the top end. Edges of net shall be stapled every 3 feet. Where 2 strips of net are laid side by side, the adjacent edges shall be overlapped 3 inches and stapled together.

Staples will be made of plain iron wire, No. 8 gauge or heavier, and will be 6 inches or more in length. Staples shall

be placed down the center of net strips at 3-foot intervals. DO NOT STRETCH net when applying staples.

Joining strips - Insert new roll of net in trench, as with upslope ends of net. Overlap the end of the previous roll 18 inches, turn under 6 inches, and staple across end of roll just below anchor slot and at the end of the turned-under net every 12 inches.

At bottom of slopes - Extend net out onto a level area before anchoring. Turn ends under 6 inches, and staple across end every 12 inches.

Check slots - On highly erodible soils and on slopes steeper than 4:1, erosion check slots should be made every 15 feet. Insert a fold of net into a 6-inch trench and tamp firmly. Staple at 12-inch intervals across the downstream portion of the net.

Rolling - After installation, stapling, and seeding, the net should be rolled to ensure firm contact between net and soil.

CONSIDERATIONS

1. A surface mulch is one of the most effective means of controlling runoff and erosion on disturbed lands.
2. The choice of materials for mulching shall be based on the type of soil to be protected, site conditions, season, and economics.
3. Organic mulch materials such as straw, wood chips, bark, and wood fiber have been found to be the most effective.
4. Chemical soil stabilizers or soil binders are not effective mulches when used alone. These materials are useful to bind organic mulches together.
5. A variety of mulch nets, mats, or blankets are available to use as mulching or to hold the mulch in place. Netting and mats are especially helpful on critical areas such as waterways.

<u>Organic Mulches:</u>

Straw - The mulch most commonly used in conjunction with seeding. The recommended straw should come from oats, wheat, rye or barley, and may be spread by hand or machine. Straw can be windblown and should be anchored to stay in place.

Wood Chips - Suitable for areas that will not be closely mowed, and around ornamental plantings. Chips decompose slowly and do not require tacking. They should be treated with 12 pounds nitrogen per ton to prevent nutrient deficiency in plants. They also can be very inexpensive mulch if obtained from trees cleared on the site.

Bark Chips, Shredded Bark - By-products of timber processing. They are often used in landscaped plantings. Bark is also suitable mulch for areas planted to grasses and not closely mowed; and may be applied by hand or mechanically. Bark is not usually toxic to grasses or legumes, and additional nitrogen fertilizer is not required.

There are other organic materials that make excellent mulches but are only available locally or seasonally. Creative use of these materials can reduce costs.

Chemical Mulches and Soil Binders:

A wide range of synthetic, spray-on materials are marketed to stabilize and protect the soil surface. These are emulsions or dispersions of vinyl compounds, asphalt, rubber, or other substances which are mixed with water and applied to the soil. They may be used alone or may be used to tack wood fiber hydromulches or straw.

When used alone, chemical mulches do not have the capability to insulate the soil or retain soil moisture that organic mulches have. This soil protection is also damaged by traffic. Application of these mulches is usually more expensive than organic mulching, and the mulches decompose in 60-90 days.

Nets and Mats:

When used alone, netting does not retain soil moisture or modify soil temperature. It stabilizes the soil surface while grasses are being established, and is useful in grassed waterways and on slopes. Light netting may also be used to hold other mulches in place.

The most critical aspect of installing nets and mats is obtaining firm, continuous contact between the material and the soil. Without such contact, the material is useless and erosion occurs. It is important to use an adequate number of staples and to roll the material after laying it to ensure that the soil is protected.

Aggregate Cover - Gravel and crushed stone provide a long-term protection against erosion, particularly on short slopes. Before the gravel or crushed stone is applied it should be washed. If vegetation is not desired, black polyethylene sheeting should be placed on the ground first to prevent seed germination and growth through the aggregate cover.

PLANS AND SPECFICATIONS

Plans and specifications for applying mulch shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum include the following items:

1. Materials to be used.
2. How mulch will be anchored.
3. Location of different materials if more than one material is used on the site.

All plans shall include installation, inspection, and maintenance schedules with the responsible party identified.

OPERATION AND MAINTENANCE

All mulches should be inspected periodically, in particular after rainstorms, to check for rill erosion. Where erosion is observed, additional mulch should be applied. Nets should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, re-install netting as necessary after repairing damage to the slope. Inspections should occur until grasses are firmly established. Where mulch is used with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.

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