

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE

STANFORD, CALIFORNIA

SOIL CONSERVATION SERVICE

TN - Agronomy - 10

December 21, 1964

USE OF WOOD CELLULOSE MULCH FIBER FOR SOIL EROSION CONTROL AND CRITICAL AREA PLANTING

During the past couple of years we have been gaining experience in the use of natural wood fibers for mulching and soil erosion control when used in hydraulic or dry seeding operations. We now have enough information and experience on the use of natural cellulose wood fiber to recognize its value in our work.

Following are some of the facts about this material, and specifications for its use.

Fred A. Houghton, Jr.
Soil Conservationist
on State Program Staff

Some of the prominent paper companies and the lumber industry have carried out extensive research on the use of natural cellulose wood fibers for soil erosion control. Companies such as International Paper Company and Weyerhaeuser Company have thoroughly tested wood cellulose fiber, both in the laboratory and in field operations, and are merchandizing it for mulching and erosion control.

It is one means of utilizing the chips, sawdust and wood, which would otherwise be wasted, as a byproduct of the industry. Their findings are:

When cellulose wood fiber is applied to ground surfaces, either by hydraulic seeding or in a dry state, with subsequent water wetting, a strange phenomenon occurs. Great internal friction, coupled with high resiliency of the fiber, will cause, on drying, a remarkable fiber movement that results in intertwining to form a continuous mat that is relatively unaffected by subsequent rain or wind. This strong mat tenaciously clings to all ground irregularities, helping to hold the soil in place while at the same time keeping seed and fertilizer in a damp condition to provide fast germination and rapid grass growth. The fibers will eventually decompose, but not until there has been sufficient grass growth to assume the erosion problem. Such decomposition will not capture nitrogen from the soil.

Wood cellulose fiber mulch can be efficiently applied, either by dry mulching or by hydraulic seeding equipment. Both systems have merit.

The Dry System

With the dry system, seed and fertilizer are applied in the usual manner. The mulching operation follows when the seeding is completed. The wood fiber is blown over the seeded area with equipment originally designed to spread hay or straw. Where applied dry, it is then wetted down after being laid on the surface.

Machines which have a tank for asphalt emulsion can be changed over to water to add a spray into the wood fiber at the end of the discharge spout.

The Hydraulic System

Hydraulic seeding and mulching is accomplished by a one-step method, using such equipment as the Fim Hydroseeder, or others made by Bowie or Rainco. Grass seed, fertilizer, and wood fiber are added in predetermined amounts, to tanks. Water is added, and pressure pumps agitate the components into a well mixed slurry suspension which is sprayed under pressure onto slopes or other sites to be seeded. Hydraulic seeding brings the seed-fertilizer into close contact with the soil, and all types of terrain are reached with ease. Unlike the dry method, work can proceed in almost any kind of weather, as rain and wind will have no effect on the results. The slurry can be sprayed up to a distance of 150 feet, reaching inaccessible places or aiding in keeping heavy machinery or operations off wet soils or carefully prepared seedbeds.

Methods and Specifications

Actual terrain conditions will determine the proper amounts of wood fiber to be used. Generally speaking, for difficult erosion conditions, the wood cellulose should be applied on the site approximately 1/8 inch deep. 1400 to 1500 pounds per acre would be used to accomplish this thickness on these difficult areas; flat surfaces may require no more than 500 pounds per acre.

Hydroseeding, with wood fiber, has introduced a new method with advantages. Common methods in the past have been in two stages: seeding, then mulching. Mulch usually consisted of hay or straw -- around three to four tons per acre. While these materials are often low in cost, there are factors limiting successful usage. Wind will blow away these mulches, especially at the top of slopes, even though asphalt emulsions are used as binders. Heavy rains will wash away portions of such cover, clogging ditches, catch basins, culverts, etc. Asphalt will deface road signs and safety guardrails. Straw mulching cannot always be done on those days when the elements "lick up." The

straw cannot be spread great distances requiring traveling over the prepared seedbed area. Where straw is anchored by equipment or with netting, there is still the probability of the presence of weed seeds.

Thus, the use of cellulose wood fiber is a method we should consider for erosion control. It is comparable to other methods in cost, is fast in application, can be applied in difficult places under difficult conditions, and is clean and free from weed seed.

Costs and Benefits

Wood cellulose mulch fiber made from Douglas-fir or redwood on the West Coast, costs about \$100 per ton with carload price, f.o.b. plants where it is processed. Wood fiber processed in the East from southern pine, delivered on the West Coast, costs about \$150 per ton, carload price, f.o.b. the distributor.

For dry mulching, a prominent landscape contractor estimates a two-stage application of seed, fertilizer, and wood cellulose fiber, with a crew of one foreman and 8 laborers, can complete 16 acres in an 8-hour day. In this case, 1500 lbs. per acre of wood fiber is used -- an amount greater than the manufacturers recommend.

For hydraulic mulching, the same contractor estimates one crew, of foreman and three laborers, will seed, fertilize, and mulch approximately four acres per eight hour day, although this figure may vary substantially, depending on the distance to be traveled to obtain water.

Regardless of method used, wood cellulose mulch fiber is competitive with hay or straw in cost. It forms a strong, tough, clinging mat that will cling tenaciously to all ground irregularities and will help control erosion on almost vertical slopes. Contractors and cooperators will be using it more and more, requiring Service personnel to become familiar with this product for conservation planning and application.