Sow Down The Highway

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Sow Down The Highway

Proper Uses Of Grasses and Legumes Important In Maintenance

This southern Iowa field, fall plowed, with no protection has created a difficult highway maintenance problem common in many areas of the state. The use of more grass and legume crops on contributing watersheds along with conservation practices such as contouring and terracing would do much to alleviate this problem. The soil carried down to the highway in this instance came off an 8-acre watershed area.

By MAURICE E. HEATH, SELDON W. CAREY and H. D. HUGHES

Good Roads are a “must” to the Iowa farmer. Once they are built, how can we keep them from going to pieces because of washing—erosion? A big portion of the answer to that question appears to be sowing the right plants with the right methods on roadsides, cuts and fills to make the soil stay “put.” Still more of the answer lies with the Iowa farmer, for his lands adjoining the highways if not properly farmed may help destroy the good roads he wants so badly.

Iowa today has 8,641 miles of primary roads, 92,924 miles of local and county roads, and in our right-of-ways we have about 716,000 acres of land. That’s nearly as much land as in two average sized Iowa counties. It is on this area, excluding the roadbed, where adapted crops (grasses and legumes) need to be used in the road construction program to stabilize and protect the cuts, fills and roadside channels.

Some of the problems we find in highway maintenance where vegetative protection is inadequate are (1) gullying of road ditches on hillsides, (2) filling of road ditches by soil which has washed from the roadway watershed or from adjoining farmland, (3) rilling and gullying of cuts and fills, (4) the filling of culverts and other structures with silt, (5) the undermining and undercutting of structures, (6) infestation of weeds and other related problems.

Keep Soil, Water Home

In recent years the Iowa Highway Commission has made a start toward scientific studies of the roadside erosion problems. Some of the studies have been in cooperation with the Soil Conservation Service and the Iowa Agricultural Experiment Station. However, wartime conditions have reduced highway construction work since 1941 to almost zero. So the amount of carefully designed erosion control work has been limited. The results obtained, however, seem to justify the conclusions drawn and recommendations made here.

Adequate protective vegetation of grasses and legumes for erosion control and stabilization should be a part of any road engineer's blueprint. The grasses produce a strong fibrous root system that holds the soil while the stems and leaves protect the surface. The legumes seeded with the grass furnish nitrogen—they feed the grass—stimulating growth on the less fertile soils found along cuts and fills. Erosion and vegetative problems, however small, can best be approached on a watershed basis. This entails conservation practices from the top of the watershed down. Such a program may consist of erosion control both on the highway and adjacent farmlands.

County soil conservation districts are encouraging farmers to keep their soil and water at home by using soil conservation practices such as putting the steeper slopes into permanent protective vegetation including improved permanent pastures, sowing larger acreages of grasses and legumes on cropland, terracing and contouring of row crops.
The county soil conservation district commissioners (elected by landowners of the district) of several counties have entered into an understanding with the county board of supervisors setting forth means in which they can work together to their mutual advantage.

In developing a well vegetated right-of-way, we have found that in addition to seeding of the grass-legume mixture, the use of mulches, stabilizing crops, soil treatments, sodded road and intercepting ditches are important in the revegetation program. These operations should be coordinated and conducted pretty much on a mile-to-mile basis as grading and completion of the job progresses. This will provide a maximum of protection for new construction by reducing the time between the finished grading operations and application of erosion control practices.

Seeding Operations

It is important from the standpoint of establishing and maintaining vegetation that a mowable slope be constructed. This will aid materially in the prevention of sloughing and filling of ditches as well as allow for proper operation of equipment in preparing the seedbed and sowing the seed mixture.

A well stabilized roadside in Decatur County one year after seeding, sodding and mulching. Note the sodded channel. Red and alsike clover as shown above are well adapted to southern Iowa. Grasses included in the mixture used here were bromegrass, Kentucky bluegrass and redtop.

In general, all areas to be seeded should be prepared with a disk or spring-tooth harrow to loosen the surface soil 2 or 3 inches deep. On some subsoil areas it's necessary to use a scarifier to get a seedbed of proper depth.

After this operation, the stabilizing crop (oats or winter rye) may be sown and covered with a harrow followed by a cultipacker to firm the seedbed. The grass can then be sown broadcast and covered with a second rolling. Where there is considerable high-speed traffic, the shoulders should be rolled immediately to prevent air currents from scattering the seed.

The two best times to seed grasses are in the early spring (late March through May 30) and late summer or early fall (Aug. 15 to Oct. 1). On spring-seeded projects, the legumes should be sown with the grasses. On projects established in the fall we have obtained excellent results by sowing the legumes broadcast the following March when the soil surface is in a honeycombed condition.

Species, Rate of Seeding

It is important that adapted grasses and legumes be used in all areas of the state. Bromegrass and Kentucky bluegrass seed are included in all of the mixtures except in the western two tiers of counties, where bluegrass is omitted. In north-central Iowa on the level to slightly rolling land, the mixture runs heavy to bromegrass (Achenbach, Lincoln and Fischer strains) and wilt-resistant alfalfa (Ladak, Cossack, Ranger and Buffalo strains). This is also true of western Iowa except that bluestem wheatgrass is included in the mixture for the more drouthy slopes in the western tier of counties.

In eastern and southern Iowa on acid soils the mixture includes redtop, orchardgrass and timothy along with red and alsike clover. We have found the vigorous, fast growing summer annual Korean legume vegetative cover in the mixtures on subsoil areas in southern Iowa. Reed canarygrass should be a part of the mixture where there are seepy or poorly drained areas.

With proper cultural practices, good grass and legume vegetative cover is being obtained with approximately 25 pounds of grasses and 15 pounds of legumes seeded per acre. When vegetative cover is not obtained with this rate of seeding, some factor other than rate of seeding usually is causing the thin stand or failure.
Iowa road which was left exposed can be prevented by seeding and ditch as shown in the other pictures. The stabilizing crops obviously will be high.

Stabilizing Crops

The stabilizing crops used are fast growing annuals or winter annuals that furnish quick protection to the roadsides while the perennial grasses are becoming established. The stabilizing crops also help greatly in holding the mulch in place as soon as the plants have grown through the straw. Do not allow the stabilizing crop to dominate the grasses and legumes during the growing season.

The stabilizing crops commonly used with satisfactory results are oats and winter rye. Oats are recommended for use in the fall after which they winterkill. This eliminates any competition with grasses and legumes the following spring and summer. The winter rye can be spring seeded and will furnish some early quick growth in the spring but won’t grow vigorously later in the summer and will not compete seriously for moisture or offer too much shade for the grasses and legumes. We normally sow 1 bushel of winter rye per acre and 1½ bushels of oats.

Fertility, Soil Treatments

If soil fertility is good and grasses and legumes can be established with comparative ease, soil treatments are unnecessary.

In southern and eastern Iowa, on the infertile subsoil areas, commercial fertilizers including nitrogen and phosphorus (300 to 500 lbs. per acre of 10-8-6 and similar grades) have given good results in establishing grasses and legumes. Some of the sandy soils and soils formed under timber are especially low in calcium, and where possible, lime should be applied to aid legumes. The subsoil areas of the windblown soils in western Iowa have shown considerable response to nitrogenous fertilizers (150 to 250 lbs. per acre of ammonium nitrate) in establishing seedings.

Sometimes topsoil is salvaged and respread on the surface to be seeded. This practice aids greatly in obtaining successful grass establishment and we recommend it.

Strawy manure has been found very beneficial in establishing grasses and legumes on subsoil cuts and fills. The manure has a stimulating effect and acts as a mulch, holding the seed in place and stabilizing the soil until the vegetation has become established. Strawy manure could be used extensively by farmers and county supervisors on the local road system where vegetation is being established along roadsides.

Use of Mulches

The value of straw, strawy manure, threshed timothy, hay, or other similar material for mulch cannot be overemphasized when establishing protective vegetation on slopes along roadsides.

The value of surface protection by some type of cover to retard runoff and prevent excessive evaporation has been demonstrated in those areas where moisture often is a limiting factor. In Nebraska, it has been shown on a windblown soil (Marshall silt loam) that the intake of water on a bare cultivated soil—on the basis of a 5-hour duration—was only .21 of an inch per hour, while with the application of 2.5 tons of straw per acre, this soil was capable of absorbing 1.6 inches of water per hour or a total of 8 inches with no runoff. It also was demonstrated that 2 tons of straw applied to the surface was 40 percent more effective in conserving the rainfall than when the straw was disked into the soil.

We have tried various types of mulching materials on critical slopes. Those found most practical and economical were threshed timothy, strawy manure and oat, wheat and rye straw. In areas with high populations of chinch bugs, rye, wheat or barley straw should not be used for mulch because the volunteer plants encourage chinch bugs, which are very destructive to the young grass seedlings.

The “hay method” of establishing protective vegetation on slopes along roadsides involves placing 2 tons of straw per acre on the surface of the soil in the fall and then mowing it in the spring. This method has been shown to be highly effective in preventing erosion and conserving water in areas with high rainfall.

A completed section of new highway construction. The slopes have been seeded and mulched and the road ditch sodded, thus providing immediate protection for new construction. Note that the slopes are so made that they can be easily mowed, thus aiding in proper vegetative maintenance.
ing desirable grasses such as bromegrass has also proved very successful. The grass is allowed to head out and mature seed. Then the entire plant is mowed, dried and used for mulch on the new construction. The amount of seed spread per acre by this method usually is very high, and germination of the seed is spread over a long period.

We have found that mulches for best results should be applied at the rate of 3 to 4 tons per acre. This will provide for a mulch cover 3 to 4 straws deep. The mulch increases the capacity of the soil to absorb moisture. It also decreases evaporation and lowers the surface soil temperature during late spring and summer. This provides a much more favorable condition for grass seedlings to develop and usually spreads germination over a longer period.

Many observations have been made in which the value of mulch has been compared with no mulch in holding the soil and seed in place. On cuts and fills with slopes varying from as steep as 2 to 1 to the more gentle slopes of 3 to 1, results show that the soil and seed losses are very heavy where no protective cover of mulch is used. We have lost from 50 to 90 percent of the grass and legume seed from such a slope by erosion where no mulch cover was used. The mowing hazards caused by severe rilling and gullying on unmulched slopes can largely be prevented with the proper use of mulch and other supplemental practices when establishing vegetation.

Only 6 soybeans strains out of 3,000 plant exploration introductions tested in Iowa during the 6-year period 1937 to 1942 were sufficiently promising to warrant further trial in 1943.

Mulching is an essential practice in the establishing of vegetation on all highway slopes. Left: No mulch was used here on this 2 to 1 slope. Within 30 days after seeding, 90 percent of the seed was lost and severe gullying had taken place. Right: Straw mulch was used here at the rate of 3 to 4 straws deep. No soil or seed loss could be observed. The benefits derived from mulch are prevention of seed and soil loss, increased moisture infiltration, protection of young grass and legume seedlings from hot sun and wind and moisture conservation.

If one wants to produce a crop of medium red clover seed, then cut the first crop for hay in the bud stage, and the second one will then be most favored for seed production. That has been found in tests at the Iowa Station.

The lower the moisture content to which whole eggs are dried, the longer they will keep, tests at the Iowa Station have shown. At ordinary temperatures dried eggs of 2 percent moisture will keep 10 to 12 months as compared with 4 to 6 months for eggs dried to 5 percent moisture.

The great expansion of egg drying during the war has given this study much importance.

The commercial production of penicillin represents an entirely new industry, based on agricultural products, that was not even in existence 2 years ago.