Early spraying with agricultural chemicals on highway rights-of-ways can reduce maintenance costs later in the year. Here, maleic hydrazide, a growth regulator, is being sprayed on slopes to reduce vegetative growth. Highway crews find chemicals eliminate much tedious work.

Chemicals Reduce Maintenance Costs For Maryland Highways

REDUCED maintenance costs on expanding highway rights-of-ways are becoming a reality through the substitution of agricultural chemicals for costly labor. With the rapid expansion of today's modern highway systems, maintenance engineers and others are constantly looking for new ideas and ways to economize.

While mowing remains a principal method of highway vegetation management, highway engineers find that integrating chemicals into the maintenance plan often brings a better return on the maintenance dollar.

This is proving to be true with the Maryland State Highway Administration. Modern concepts in land management of ROW are being implemented thanks to the progressive thinking of the Bureau of Landscape Architecture headed by Charles R. Anderson, Bureau Chief and Richard C. Moffett, chief agronomist. He and Donald B. Cober, agronomist, have developed and incorporated the use of chemicals into the maintenance plans of the state's seven districts encompassing nearly 5,200 miles of ROW.

"We don't advocate the use of any chemical unless it actually improves the appearance of the highway," says Moffett. "Agricultural chemicals are used to achieve economies in roadside maintenance. If we spray weeds and brush or make an application of a growth regulator, it is done to lower cost, increase safety and modernize an existing method of maintenance, either hand or mechanical."

Moffett's other reasons for using agricultural chemicals are indicative of his training in weed science and agronomy. "It is not necessary today to maintain all the highway acreage with mowing machines. Some of these areas can be eliminated from a regular maintenance schedule," he says. Areas that can have a reduced standard of maintenance are left to return to the vegetation of the adjacent area. Certain areas might be more pleasing to the passing motorist if they are permitted to return to the natural vegetation, thus eliminating work for a labor force.

One of the first jobs that Moffett tackled in selling the concept of chemical vegetation control was select and train applicators. Few, if any, men had knowledge of chemicals. Most were equipment operators or on the promotional list for road foremen. Of these, Moffett picked those who were interested in advancing themselves and willing to enter a challenging new field.

"We started with fellows familiar with agricultural practices and trained them in equipment," he says. "But that didn't work out well. Now we take equipment operators and teach them about vegetation control with chemicals."

He brings these people in and conducts classes. "These men are taught to think," says Dick Moffett.

"I tell them that they are an elite group. They must know at all times

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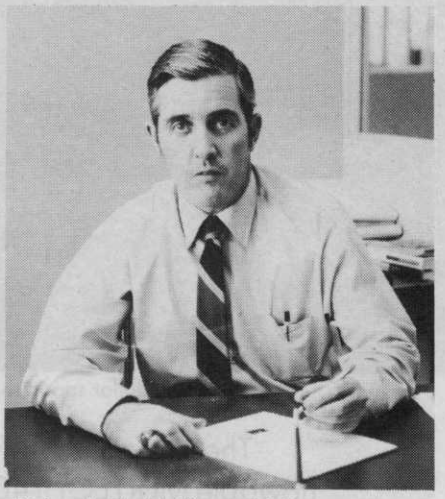
what they are doing. They must have a thorough knowledge of herbicides and they must be able to establish a report with the public and highway personnel." The objective is to teach each man as much as he is capable of learning.

The program as it is now set up calls for a two year apprenticeship — before a man is qualified to apply herbicides. During the two years the men become familiar with the basic principles of weed and brush control, traffic conditions, mixing and handling chemicals, and maintaining application equipment. Each man is then assigned equipment of his own which he is required to maintain. They are currently using primarily Myers sprayers designed for highway use.

Moffett contends that projecting the use of chemicals into a maintenance plan must be a carefully coordinated effort. Chemical application can accomplish one thing while mechanical mowing can do another, he says. Their interaction must be complimentary.

"We had to sell the idea of herbicides and plant growth regulators to various people in the districts," recalls Don Cober. "We had to learn who to contact. The key man in a district might be sold but if the man on the mower wasn't convinced, the program in that area would not be effective. We had to coordinate the actions of the district and our suggestions on the use of chemicals so they would be one. This involved winning the confidence of key people.

"We had to set goals. If it's to educate, you don't have to see many people. If it's to get the material on the ground, then you have to get out there. Originally our objective was to saturate a level of information about chemicals at a personnel level that you expect would go down the line; however, that didn't always get the material on the ground," he says. "As a result, I had to become a partial applicator in addition to salesman, supervisor and advisor."



Richard C. Moffett, chief agronomist, Bureau of Landscape Architecture, Maryland State Highway Administration.

In addition to the spray equipment assigned to the districts, the Roads Commission has two large capacity sprayers. One is a Myers air carrier unit developed for railroad ROW spraying. It is skid mounted with a 1000 gallon rust-proof tank. A two stage centrifugal pump capable of producing 100 gpm at 190 psi delivers material to eight broadcast nozzles and a 29 inch air carrier machine. It has the capacity of spraying material 40 to 50 feet from the road shoulder. Moffett uses this sprayer to apply maleic hydrazide, a turf growth regulator.

The second spraying unit is a redesigned 450 gallon off-the-road

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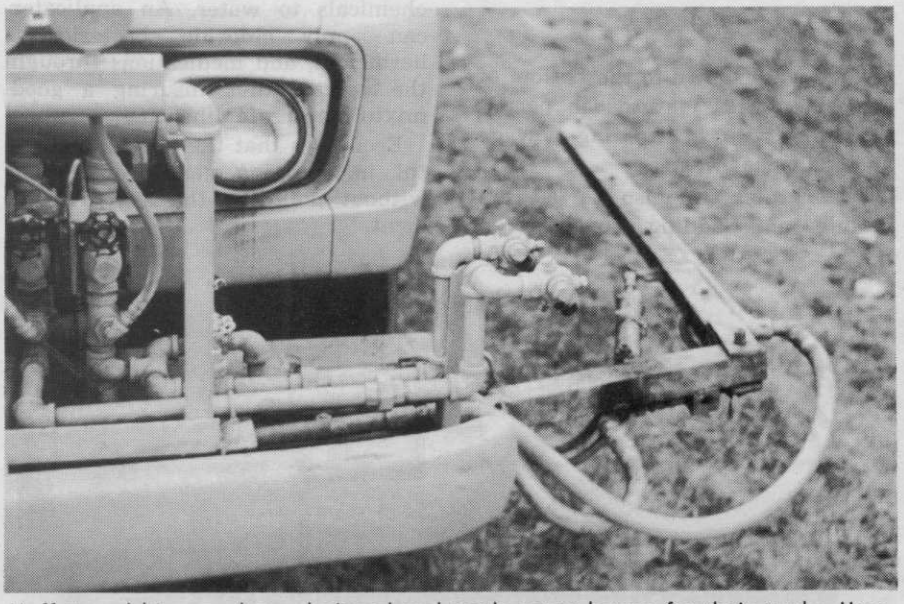

Moffett and his crew have designed and made spray booms for their trucks. Here is one made of channel steel. Mounting on front of truck permits the driver to view what is being sprayed.

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sprayer capable of producing 100 gpm at 100 psi. It has a hydraulic control, three section 24 foot boom mounted with T jets and broadcast spray nozzles. This is useful in applying herbicides on slopes as steep as 3:1 and in areas where the spray must be restricted to prevent herbicide damage.

"We had to modify our spraying equipment in order to meet highway needs," notes Dick. "We wanted larger tanks that would hold thousand gallons. We also made our own booms."

He says their spray equipment is worked; it doesn't just sit around. Crews spray eight to nine hours a day, 130 days a year. "When those sprayers are turned in their tongues are hanging out," says Dick.

Like some states, Maryland, with 23 counties, has three physiographic provinces which complicate the maintenance problems. A traveler coming from east to west can pass through Coastal Plain Piedmont, and Appalachia provinces. Each province has its own geographic differences including soil types and vegetation species. Incorporating a chemical program to encompass all vegetation problems is quite an undertaking.

"We try to start our spraying operation by early to mid April," says Don Cober. "We go to the southern counties first to combat early vege-

Spraying personnel were former rights-of-way maintenance men. Donald B. Cober, agronomist, (left) engages in a discussion with: (l-r) Gilbert Mills, lead landscape chemical applicator; Marshall Von DenBosch, landscape chemical applicator; Clarence Gough, landscape chemical applicator; John Dusty Rhodes, Jr., landscape maintenance supervisor; and Robert Duke, lead landscape chemical applicator.

tative growth." It also allows crews to spray roadsides before neighboring farmers set tobacco or tomato transplants.

"Early sprays are for garlic, young brush and winter biennials," says Moffett. "This calls for selective herbicides such as 2,4-D or 2,4,5-T, depending on what's to be sprayed." As crews work northward they vary chemicals, rates and application techniques to match the vegetative conditions of the area.

"We don't want brown out," says Moffett. "We're after herbaceous material but not at expense of changing the color or the natural vegetation. Last year we sprayed out further into the ROW. The fall coloring that resulted seemed to blend into the surrounding countryside and people didn't notice it so much."

The agronomist has tested residual chemicals around sign posts, markers and guardrails with success. However he finds that these chemicals contribute to erosion problems when used in too high a concentration.

"For guardrails we prefer to apply residual and contact chemicals that will give abatement in a two-step operation, he says. "This combination allows for vegetation control within the guardrail area but not the problems associated with lateral movement of chemicals.

Another area where Moffett and Cober have applied their chemical knowledge is in growth retardants. They report varying results with applications of maleic hydrazide in the fall. But good inhibition has been obtained in the spring when treatments are made between April 20 and May 15. Areas sprayed after this time require mowing to remove seed heads.

"Use of growth regulators has been more effective on better turf areas," says Moffett. "We fertilize weak stands of grass in areas where we anticipate using MH-30T. There is a slight discoloration to grass when treated in the spring. Compared to untreated grass, a treated section will remain a lighter green color, then progress to a richer green color in later June. The darker green color is retained until fall."

Moffett notes that the period to apply maleic hydrazide is only about a month long. "If the material can be put on in the early part of the application month, the grass will grow to a height of approximately 8-10 inches," he says. "But as you approach the latter half of the month, there will be at least one mowing required to eliminate the seed heads. The formal cost of the material restricts its use to high maintenance cost areas such as guardrails, curbed medians, bridge abutments and steep slope areas which require hand mowing. In the last two years, the cost of MH-30T has dropped significantly so that it is now used in quantity along our roadsides."

Don Cober says that one indicator of their success with this integrated approach to ROW maintenance has been the acceptance of the program in the districts. "We try to stay ahead of things," he says,

Staying ahead means coming up with new and different approaches and solutions to maintenance problems. Moffett and Cober are currently working on a series of manuals including such aspects as herbicides, slope management, mowing standards and others. Closely tied to this will be different job titles for personnel involved with chemicals and their application. Underlying the entire concept is the fundamental principle of safety to the motoring public.