



Hydraulic boom with three 8 ft. sections, that can be operated independently of each other, are part of this truck used by California highway department.

## How We Control Vegetation at the California Division of Highways

By DAN CASSIDY

Landscape Specialist, California Division of Highways, Sacramento

IT IS THE POLICY of the Maintenance Department of the Division of Highways to replace as much as possible the blading, discing, and mowing, with the less expensive chemical methods. Low rates of chemicals are being used to eliminate fire hazardous grasses and to leave within the sprayed areas those plants that do not cause a fire hazard or problem to the maintenance of the highway or to the surrounding farmers or home owners. Plants such as Turkey mullein, Baccharis, Alfalfa where no seed crops are being grown, and many other low growing plants may be left within these areas.

### Objective: Fire Prevention

In the past, the chemical spraying was limited to a 4 foot strip placed to prevent fires from spreading from the right of way. The present chemical control is now started from the edge of the pavement outward to prevent fires from starting. An added benefit of the spraying has been a reduction in the noxious weed

population. A reduction in the amount of mowing needed has reduced the cost of roadside care and eliminated the duff caused by repeated mowings. This dry material is believed to be responsible for many roadside fires. Certain weeds have been a host for insects that damage surrounding farmers' crops and spray rates may be adjusted in these areas in the annual spray program to eliminate such weeds. Some of these insects have been the beet leafhopper in the Imperial Valley and aphids in the Salinas Valley.

This spray program is planned to be done annually and is started in the late summer or fall of each year. We feel this annual program is the safest possible method of controlling vegetation. We use a basic spray rate of 4 lbs. of Simazine in 100 gals. of water per acre. Addition of Amino-Triazole is sometimes necessary when spraying is done later in the year after the annual grasses have germinated. In landscaped areas, low rates of soil-acting herbicides are being used after the plants are established, ones that have been in the ground one year. Materials such as Simazine at 1 to 2 lbs.

active per acre in 100 gals. of water may be sprayed directly over the plantings with no damage to existing plants. Some other materials being used in landscape plantings are Dymid or Enide and Casaron. In areas where spraying of vegetation control chemicals would be objectionable, such as areas with very erodible soil, diamonium phosphate has been sprayed on the mature annual vegetation. This has been moderately suc-



Two 60-gal. stainless steel tanks, mounted behind 2000 gal. water tank, are shown in this rear view of, all-purpose vegetation maintenance spray rig described in this article.

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cessful but there is need for a better method of making this material stick to annual grasses through the entire fire season, because light rain or heavy winds can dissipate this material.

### Testing Growth Inhibitors

Growth inhibitors are being tried under varying climatic conditions. As yet no material or method has been found to control annual fire hazardous vegetation at a height that would make it unnecessary to mow. Some satisfactory results have been obtained on inhibiting the growth of shrubs that formerly were pruned often, such as those around headlight screens in narrow median divider strips, or shrubs in planter boxes on freeway islands that must be kept low for sight distance. These plants can be sprayed rather quickly in comparison to the time it takes to prune and haul the brush, to say nothing of the hazard caused to the traveling public and the men doing the work.

We believe that one of the greatest needs is for effective growth inhibitors, or better methods to apply these growth regulators that can be used at different times of year and will not cause noticeable damage to the plant.

The past year has seen increased use of contact sprays on freeway ground cover plantings. These materials are being used to edge ice plant and ivy, doing away with a very expensive method of cutting with mechanical edgers and the problems of hauling and disposal after cutting.

### Built Versatile Spray Rig

A number of different types of spray rigs are used by the spray crews in different areas of California. Several years ago the Division of Highways Equipment Department took a commercially available hydraulic boom and adapted it for use on the front of the spray truck so the equipment operator could work from the cab and both he and the driver could see the spray operation. This boom has three 8 ft. sections that can be operated in-

dependently of each other to follow the contour of the ground or be moved out of the way of obstructions. Nozzles in each section may be independently or collectively operated. During the past year a further improvement in spray equipment has been made by the Equipment Department. A 2000 gal. tank was mounted on a truck frame with two 60 gal. stainless steel tanks mounted behind the large tank. Two separate chemicals may be mixed in a heavily concentrated form in each of these tanks; a proportioner pump will measure and mix the material from either or both 60 gal. tanks at any rate per acre that is desired.

### Liquid vs. Solid Fertilizers

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that 1 quart of the concentrated liquid fertilizer be diluted to 15 gals. with water (1:60 dilution) and applied to 500 sq. ft. of turf, approximately 0.01 acres. Nitrogen concentration in this diluted solution is about 0.4%, and when applied at the recommended rate it will supply about 50 lbs. of N per acre.

It will require about 26 gals. of the concentrated liquid to supply 50 lbs. of N per acre of turf. When this is diluted 60 times, volume will be 1,560 gals. which weigh nearly 12,500 lbs. In contrast, ammonium sulfate, which does not require dilution, will supply 50 lbs. of N in 238 lbs. of material.

When liquid fertilizers are applied by broadcast methods to turf or foliage, considerable dilution must be made to prevent plant injury. This dilution results in a marked decrease in the amount of nutrient contained in a unit of the diluted solution and makes large-volume application necessary.

An alternative procedure would be to inject it in a more concentrated form below the ground surface to minimize burning. However, this can be an undesirable practice for turf. Another solution to the problem is to apply concentrated liquid forms into the irrigation water

The 2000 gal. tank needs to carry only water, so the unit may be taken off vegetation spraying and be used for watering planted trees and shrubs without the need of cleaning out tanks or the danger of some chemical being left in the unit after cleaning which might damage plantings.

Different areas of the state of California, variable climatic conditions and diversified land use adjoining the highways and freeways, call for different methods of vegetation control. We feel we have been progressive in trying new chemicals and developing new equipment for this program.

when sprinkling and avoid hauling the large quantity of water. Various metering devices can be obtained for this purpose.

The fact that a large quantity of diluted material is necessary when using liquid fertilizers on turf does not mean that liquid forms are more costly than solids. Ease of handling liquids by pumps or gravity, and their application in irrigation water, may keep cost of using liquid fertilizers relatively low. However, each operator must decide this on the basis of what handling and application costs are for his set of conditions and with his facilities. The cost of the *entire* operation must be considered when the decision is made.

Liquid and solid fertilizers, when properly applied, have been equally effective in producing crop response when compared on a per-pound-of-plant-food basis. In the use of each form, there are certain advantages and disadvantages, and these must be considered. Under certain conditions, the increased ease of handling liquids by pumps or gravity and application in irrigation water or by other means may make liquid fertilizers most economical. Hence, cost to handle and apply the two forms must be considered as well as the cost per unit of plant food in the two forms of fertilizer.