Common Sense Turf Management on Today's Highways

W. L. HOTTENSTEIN, Ohio Turnpike Commission, Berea

•THIRTY years ago it would have been difficult to find a highway engineer who would agree that grass or turf could contribute a necessary function to the the highway right-of-way. Today it would be difficult to find one would disagree with the idea that turf is here to stay.

Establishing and maintaining turf on roadsides is big business. It deserves to be. Turf-type vegetative ground covers have contributed more to the control of erosion on roadside areas than all other plant associations combined, and have provided an effective medium for maintaining a sense of orderliness on the modern highway right-of-way. Turf values will become increasingly important as modern highway systems such as the Interstate System and tollways are expanded.

Unfortunately, the management of turf on roadsides has not been given the same professional attention as the establishment phase. It would be difficult to find two States that employ the same standards with reference to turf management. In fact, adjacent county maintenance organizations in the same State frequently pursue different policies to accomplish what might appropriately be termed "turf mismanagement." During the past 25 years, specifications for seeding, sodding and mulching have been developed that provide excellent controls for these operations under every conceivable condition. However, similar standards to provide controls for managing the resulting turf are conspicuous by their almost complete absence.

For the purposes of this presentation, the turf management categories to be discussed will be limited to mowing and the use of herbicides. Fertilizers and soil amendments will be bypassed with a comment made by R. E. Blaser, the agronomist from Virginia: "Need for fertilization should be based on the condition of the turf." Erosion-resistant stands of grasses will persist for five to ten or more years on the fertile soils in the Midwestern States, if properly managed with respect to mowing and broadleaf weed-control.

B. J. Butler and R. R. Yoerger of the University of Illinois reported in 1962 that 3,500,000 acres were mowed along State highways. It has been estimated that completion of the Interstate System will add another 1,000,000 acres. Considering the fact that these many acres of roadside are being added to the maintenance engineer's responsibility without a corresponding increase in his budget, it is almost inconceivable that so little has been done to develop management standards. It would be interesting and perhaps somewhat embarrassing to analyze the reason for this obvious lack of maintenance know-how. Could it be that landscape engineers and architects have been too busy helping designers, drawing plans, and writing specifications for new work? Who should be doing the planning and promoting the procedures needed to bring the roadside turf management problem into proper perspective?

A modern, 4-lane, divided highway right-of-way contains about 25 acres of roadside per mile. With a 40-ft wide strip of turf in the median and an equal area immediately adjacent to the outside edges of the roadways, there are 9.7 acres of critical area per mile of highway. On the Ohio Turnpike, these areas are mowed an average of 11 times a year, at a cost of approximately $2.15 per mowing per acre. Butler and Yoerger reported last year that four States spent an average of $10.21 per acre for roadside mowing which, of course, would not be limited to the critical, centrally-located areas which lend themselves to gang equipment and production-line methods.

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So the figures are not comparable, but, considering the millions of acres, that $10.21 per acre is a soul-stirring figure.

Also included in the University of Illinois report was an estimate that hand-mowing in 37 States was still being done on 100,000 acres. Imagine the millions of dollars wasted on this operation. Workmen on the Ohio Turnpike are not permitted to do any hand-mowing. It is not necessary because better results can be obtained much cheaper with other methods.

How can the pampered and perhaps uncontrolled equivalents of golf course greens on many acres of roadside turf be justified? Why some engineers and administrators cling to the idea that slope areas and fence-line areas must be mowed as frequently and as closely as the turf areas adjacent to the roadways has always been a mystery. Mowing to achieve a lawn or fairway appearance from fence-line to fence-line through rural and forested countryside belongs in the luxury category, and besides, it cannot be justified aesthetically. Strangely, such practices evoke favorable comments for the reason that they create a neat appearance. Such high-class, city-park type mowing is not within the capacity of the maintenance engineer's budget. Even from an appearance standpoint such practices cannot be justified. Many of the roadside areas within the right-of-way should be managed to achieve a natural effect, thus making them an integral part of the adjoining countryside. The picture of mile after mile of neatly maintained turf areas resembling lawns and fairways is neither distinctive nor indicative of the character of the natural environment of the State or locality the motorist views.

The basic elements of a common sense mowing program are as follows:

1. It is not necessary to mow every acre of roadside vegetation in order to maintain properly the right-of-way of a modern highway.
2. The mowing program must be planned. Roadside areas should be arranged in categories and a vegetation management program prepared to fit the needs. Cultural practices and land-use patterns along the right-of-way should dictate the roadside treatment. As a general rule it should not be necessary to mow the following locations: slope areas 2.5:1 and steeper; roadsides adjacent to natural woodland and swamp areas; and areas in agricultural sections with dense uniform stands of desirable species of grasses and legumes beyond ditch lines.
3. There must be a reason, a justification, for mowing the various areas comprising the roadside.

It is encouraging to report that evidence of positive action to develop control policies for turf management is making a belated appearance. In Feb. 1962, the highway maintenance standards subcommittee of the American Association of State Highway Officials distributed a paper recommending standards for roadside mowing. Unfortunately, this document does not entirely clarify the big question: "Where to mow?" It states, in part, "Where mowing is required..." and that is rather non-specific terminology.

Some States, notably Massachusetts and Michigan, have already initiated programs to reduce mowing frequency on certain areas, and to eliminate mowing entirely on specific roadside areas. Michigan is developing contour mowing as an answer to the expensive and artificial appearing "fence-to-fence" mowing practice still followed along thousands of miles of modern highways. A somewhat different solution to the mowing problem is being sought in Massachusetts by establishing woody species of ground cover and encouraging volunteer growth to occupy roadside areas in locations where safety and other basic highway functions will not be jeopardized. These departures from traditional maintenance concepts are being made primarily to improve the status of the maintenance budget. It should be noted, however, that better looking roadsides will accrue, like the other "bests" in life, as a free reward.

Turf management along roadsides today cannot be accomplished economically without the use of selective herbicides and sterilants. Weed-control chemicals can effectively augment a mowing program and actually improve the quality of the turf.

The problem of controlling and eradicating vegetation beneath the guardrail is still very expensive for those organizations that persist in employing manual-mowing methods. During 1957, guardrail areas along the Ohio Turnpike were mowed for the

last time with hand-guided sickle bars. The cost per mowing per mile of guardrail was $17.50. Three mowings were required for minimum control. So $52.50 per mile was spent to accomplish a result less satisfactory than that now being achieved with sterilants and non-selective herbicides for approximately $40.00 per mile per year, and that includes the treatment of an average of 45 sign and reflector post areas per mile. The use of chemicals, therefore, represents a savings of at least $12.50 per mile of guardrail, plus a dividend of clean areas around posts. An additional plus value attributable to spraying is man-hours released for other more productive maintenance operations—an important consideration in an organization where experienced, high-quality labor is difficult to obtain.

When broadleaf weeds such as dock, Queen Anne's lace, and chicory became unduly aggressive and prominent in the median and other areas immediately adjacent to the roadways, a 2, 4-D treatment was initiated. Within a year the population of offending species was reduced to an acceptable minimum at a cost of $5.25 per acre per year for three applications. During 1962 only two applications were considered necessary, and the cost was reduced to $3.50 per acre—just a little more than the cost of one mowing.

In the non-mow, spray areas adjacent to agricultural lands, a similar treatment with 2, 4-D is used. On these fence-line and interchange island areas the same number of applications and the same quantities of chemical are used, but the cost is $5.25 per acre for two applications, or $7.85 for three. This program has been the major factor in the struggle of Ohio Turnpike Commission forces to maintain dense stands of weed-free turf in non-mow areas. It is important to remember that these areas are not generally adaptable to gang-reel mowing equipment, hence the mowing costs eliminated are appreciable.

Several States have had encouraging experiences with MH 30 as a turf-growth inhibitor. This chemical is comparatively expensive, however, and if a mowing program for critical roadside areas (median and other areas inside primary ditch lines) is conducted economically, it will cost about the same as mechanical mowing. These comments are based on data obtained in connection with the establishment of plots along the Ohio Turnpike. Mowing the critical areas 11 times with tractor-drawn tandem-reel mowers cost about the same as a combination of 1.3 gal of MH 30 per acre, plus three mowings which were considered necessary to produce an equivalent appearance. Employing rotary sickle-bar or hammer-knife type mowing equipment on critical areas would, of course, result in much higher costs per acre than the combination chemical inhibitor plus mowing treatment. Limited experience with MH 30 indicates that haphazard use will not produce effective results. It must be applied carefully at the proper time and in proper amounts.

As soon as consistently uniform and predictable results can be expected by the maintenance engineer, and the economy factor satisfactorily established, the use of chemical growth inhibitors will be accepted generally as a valuable tool for management to add to its assets.

Reference has already been made to different types of mowing equipment and their adaptability to various roadside areas. Obviously, an effective and economical mowing program cannot be developed without properly relating the mowing machine to the character of the area to be mowed. The University of Illinois study reported that a sickle bar averaged 0.68 acres per hour as compared to the 0.75 acres per hour cut with a rotary mower. Reel-type mowers averaged 2.7 acres per hour which is 3.6 times the potential of the average rotary. During the past three years average output on the Ohio Turnpike with tandem-reel mowers was 3.75 acres per hour, or 1.4 times the national average.

One of the problems associated with a turf management policy that excludes certain roadside areas from mowing is fire originating within the right-of-way as a result of carelessly discarded burning butts. A build-up of dead and dry grass and other vegetation in non-mow and non-spray areas can support a fire that will seriously damage sensitive species. If not controlled promptly, such fires can spread to adjacent property and cause extensive damage and strained public relations.

Policy makers on the Ohio Turnpike staff believe that the economies and aesthetics represented by these areas far outweigh the minor damage caused by a comparatively small number of fires which were promptly extinguished.

Another aspect of the fire problem pertains to those areas of well-established turf between the primary ditch line and right-of-way fence adjacent to cultivated lands. Here the damage is restricted to roadside areas, and results mainly in a deterioration of sensitive species which may lead to an invasion of broadleaf weeds. If fire in these areas is a serious concern, it can be practically eliminated by mowing once a year. In the humid temperate and north temperate zones, this mowing should be done in late summer or early fall with a hammer-knife type mower that will effectively chop and distribute the mowings, thus eliminating an expensive hay-removal operation. Careful mowing in early fall with the proper equipment will be followed with a regrowth of new grass that will be fire-resistant until snow flies, and will not be a serious hazard in the spring since most of the inflammable material will have disappeared.

Another method which might serve the same purpose at less expense would be an application of MH 30 in the spring season. Retarding growth would eliminate a major portion of the seed stems and the longer leaf shoots, thereby preventing an accumulation of quantities of inflammable material.

The frequency of fires and extent of damage in a particular section or State should govern the decision to mow or not mow roadside areas of this type. They are not being mowed along the Ohio Turnpike.

An effective roadside turf management program can be accomplished by preparing a plan which includes the following elements:

1. Zoning of the right-of-way into the several categories of mow and non-mow areas to meet the specific requirements.
2. Use of herbicides as a supplementary tool to mowing in order to eliminate weed species and encourage desirable grasses. This can save numerous mowings, promote good public relations, and, particularly in the critical areas, add appreciably to the effectiveness of the mowing operation.
3. Application of sterilants to eliminate vegetation and the need for hand mowing around post areas and beneath guardrails.
4. Use of mowing equipment best suited to the character of the roadside area being maintained.
5. An effective method to implement instructions and directives so that district, division and county personnel will initiate and conduct operations in a uniform manner.