

MAINTENANCE OF INTERSTATE HIGHWAY ROADSIDES AS AFFECTED BY HIGHWAY DESIGN

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The necessity of integrating highway maintenance into highway design has been intensified by ever-higher standards of construction. The appearance of highways is important to road users and to the abutting property owner, whether a rural farmer or a suburbanite. A well-planned and maintained roadside is an investment in public good will and is the readily visible evidence of an efficient, on-top-of-the-job organization. Therefore it behooves the highway engineer to plan and build design standards into their construction that will permit the lowest possible unit maintenance costs.

The problem of maintenance assumes staggering import when one considers the increased acreage of the 300-ft right-of-way recommended for the Interstate System of Highways. Exclusive of the extensive additional acreage in interchanges, it totals over 36 acres per mile, an increase of 275 percent over an 80-ft right-of-way. The 200 percent increase in traffic areas is in itself a major maintenance consideration, but the maintenance of a roadside increased in area by 300 percent could be the straw that breaks the highway administrator's back, endeavoring as he does to cope with spiraling costs of both construction and maintenance.

There is evidence that higher standards of maintenance are and will continue to parallel higher construction standards. Design considerations effecting reduced unit maintenance costs become increasingly important, although they are not new. They have evolved over a considerable period of time through theory, trial and error. Literature on the subject is extensive and these comments will be restricted to a few of their effects on maintenance. The important question to ask now is, "Are design considerations effecting reduced maintenance costs being employed?"

The design of the cross-section has a fundamental relationship to maintenance costs. A streamlined cross-section with flat slopes adequately rounded and warped is a must to permit mechanization of maintenance. Slope gradients must be 3:1 or flatter if vegetation is to be mowed with modern mechanized equipment. Even with the help of an increasing number of chemicals to control vegetation, an annual mowing is probably necessary in most states. Hand methods and the inefficient employment of equipment are out of the question cost-wise. Whether or not mowing is done, flat rounded slopes hasten the establishment of erosion controlling vegetation, tend to reduce the incidence of slides and slippages, and are more pleasing in appearance. They minimize the necessity of guardrails and other traffic delineators. If these appurtenances can be omitted without sacrificing safety, both their original cost and maintenance are eliminated. Thus a cross-section design that subsequently permits economical maintenance is a primary consideration and must be adopted if low unit costs are to be achieved.

The design of wider median areas, an integral part of the cross-section, deserves special consideration because this prominent portion of the roadway warrants more intensive maintenance, and involves increased operational costs. Traffic-wise wide medians (60 ft or more) have numerous advantages. Oliver A. Deakin aptly list-

ed them in his paper on Median Design published in the 1958 Report of the Committee on Roadside Development. He includes the conservation of existing vegetation, the reduction in monotony due to varying cross-section treatments possible because of added space, and the minimizing of erosion problems by the retention of the native vegetative cover which helps to slow down the rate of storm-water runoff. And, with a wide median, headlight glare from opposing traffic, often blinding with narrow medians, is of no consequence.

The value of saving native growth in a wide median area is particularly important. An established natural growth, most economical of maintenance, is retained without waiting years, or expending considerable sums in planting, to obtain comparable benefits. It is an effective means of reducing headlight glare. The hazard of unauthorized crossings is eliminated. All too frequently desirable vegetation is carelessly and ruthlessly destroyed during the clearing and grubbing operations.

The design of drainage structures in medians which are mowed has an important bearing on maintenance costs. Dropped inlets and flared inlets are superior to headwalls which either tend to be unkempt in appearance or entail costly hand labor to maintain in a condition comparable to adjacent areas.

Plantings, if introduced in the median, should be designed so as to interfere as little as possible with mechanized mowing operations. Plants should be selected and grouped so as to eventually form a close-knit ecological entity that will need little or no maintenance after establishment.

Basic planting design considerations have been exhaustively covered in Special Report 23, "Planning and Management of Roadside Vegetation," published by the Highway Research Board in 1956. The principles that were established, and are as germane today as then, will not be repeated; a few comments and observations are submitted.

Again, the economies gained in construction and maintenance by adequate controls exercised over clearing and grubbing operations should be stressed, as well as the desirability and effectiveness of protecting and retaining existing species. Slope gradients, plant species to be used for ground cover, standards of appearance and costs of maintenance must be evaluated and correlated in the planting design. Following construction, the growth of native volunteer species not inimicable to highway traffic or maintenance operations should be encouraged on those slopes where machine mowing is not possible.

The principle that treatment of vegetation is governed by the changing character of the landscape adjacent to the right-of-way is advocated. Therefore, trees and shrubs should be introduced sparingly in open country, except for proven functional purposes, and the introduction of grasses into woodland areas is not recommended except for the temporary control of erosion on slopes disturbed by construction. These are important considerations in building low cost maintenance into roadsides.

There is some concern with the number of illustrations appearing in current periodicals showing long, treeless tangents on interstate highway construction. It is hoped that they are not indicative of the finished product because, if this proves to be the rule, a more monotonous, uninteresting cross-country trip cannot be envisioned. True, one cannot expect tree-shaded lanes on these modern monsters, but there is no reason, maintenance or otherwise, why trees and shrubs cannot be used, with the interest and values they will impart to the traveler and to the roadside of the Interstate Highway System. Plant groupings in scale and in keeping with the surrounding countryside, but stripped of all gingerbread elements, have utility and are a means of promoting safety and giving beauty and economy to the highways.

Fundamentally, the problem of integrating highway roadside maintenance and highway design begins with location and can be achieved most economically through the design and construction phases—not later through reconstruction by maintenance forces. Highways must be designed to make most effective use of modern mechanized equipment and methods if maintenance of the highways of tomorrow is to keep pace with construction standards.