

REPORT OF
SPECIAL PROJECT COMMITTEE ON STABILIZED TURF SHOULDERS

By Harry H. Iurka, Chairman
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The progress report of the Committee on Stabilized Turf Shoulders is in two parts, one from the Maintenance Engineer of Michigan, Mr. Downey, a member of our Committee, and one from the State of Illinois.

HIGHWAY SHOULDER PRACTICES IN MICHIGAN

By Burleigh R. Downey
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At a meeting of the Special Project Committee on Shoulders of the Committee on Roadside Development in Washington on December 12, 1949, some interest was expressed in regard to certain phases of highway shoulder maintenance in Michigan. At that time the writer briefly mentioned certain features of our practice which were dictated by local conditions, including type of shoulder, width of pavement, shoulder width, traffic counts, percentage of trucks, etc. The following remarks amplify some of the statements made at that time.

New construction practice in Michigan specifies "stabilized earth shoulders" in all cases, and construction contracts awarded include an item under "shoulder borrow" to be applied on the earth grade cross section as follows:

A 3-inch lift of soil placed on the shoulder to a width of 8 feet. This is generally imported material. The material, usually topsoil, contains a certain amount of clay, etc., for stability. However, in some cases, topsoil stripped in connection with the earth grade is stored and used for this purpose. This 3-inch layer of material is thoroughly incorporated into the granular sub-base to a depth of 6 inches and compacted with a tamping roller. In the case of bituminous recap on older pavement, the shoulder lift is made with topsoil selected for its stability; that is, preferably topsoil with some gravel in it.

The foregoing operation is accomplished by the contractor as a part of his fine grading. Subsequent operations, such as fertilizing, seeding, mulching, etc., are carried on by the Maintenance Division.

As a first step, fertilizer is applied and incorporated to a depth of 3 inches by harrowing. Fertilizer generally consists of one-third chemical and two-thirds organic. The rate of application is approximately 600 pounds per acre.

After fertilizing, a straw mulch is applied at the rate of 2 tons per acre. This mulch is held in place by disking. After the fertilizing and disking operation, seed is applied at a rate of about 50 pounds per acre. The seeding mixture, in general, consists of 60 percent perennial rye grass, 20 percent redbud, and 20 percent alsike clover.

Grass or turf shoulders are preferred over other types for obvious reasons of economy, easy maintenance, etc. However, under some conditions, it is not possible to maintain satisfactory full-width shoulders of this type. The main factors affecting the success of this type of shoulder are (a) the quality of shoulder soil, particularly water-holding capacity; (b) pavement width; (c) traffic volumes.

Due to the foregoing conditions which affect our maintenance, we have found it necessary to modify our full grass shoulder specification; that is, when traffic volumes are too high, particularly on the older 18 and 20-foot pavements, it has been found necessary to introduce a strip of stabilized gravel immediately adjoining the pavement edge. This stabilized gravel, sometimes surface-treated with bituminous material, varies from 2 to 3-foot panels for traffic volumes from two to three thousand vehicles per day, up to full-width gravel with bituminous treatment next to the pavement slab on heavily traveled truck routes.

Our District Maintenance Engineers, with the cooperation of the District Foresters, make inspections from time to time of shoulder conditions in each district. From the data obtained on these inspection trips, maps are prepared showing the type of shoulder and recommended width of gravel strip, in case it is found that full-width grass shoulders cannot be maintained.

Shoulder seeding in Michigan is always done in the spring. In this way we avoid soft shoulders during the winter. Current per acre cost for shoulder seeding, including all materials, equipment, and labor, runs between \$140 and \$180 per acre.

For convenience in considering maintenance costs, Michigan may be divided into four climatic and industrial zones. The first, or Zone 1, is in the Upper Peninsula. This zone experiences the most severe weather conditions of any, but is the least developed industrially, agriculturally, or commercially. For that reason, it has the lightest traffic volume, together with the fewest number of trucks. Zone 2 includes the upper part of the Lower Peninsula of Michigan; this zone is quite similar to Zone 1 with the exception that there is somewhat more agricultural development and correspondingly more population and, for this reason, somewhat heavier traffic volumes. Zone 3 includes the middle portion of the Lower Peninsula. In this zone we have a greater agricultural and industrial development. Traffic volumes are, in general, medium to high, with quite a few trucks. In Zone 4 we have the highly concentrated industrial developments around Detroit, and across the State in other industrial cities such as Jackson, Battle Creek, Kalamazoo, etc. This zone also is very highly developed agriculturally. Traffic volumes are extremely high.

With the above explanation as a background, I am offering the following table, which I believe is a good illustration of the influence of traffic volumes

on the cost of shoulder maintenance. In this tabulation I have given cost per mile of shoulder maintenance on two types of pavement; group number 2 being concrete and other rigid-type slabs; and group number 3 being the flexible type, including surface-treated gravel and bituminous concrete on gravel base.

1949-50

COST PER MILE FOR SHOULDER MAINTENANCE

	<u>ZONE I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
GROUP II (Conc-Rigid)	65	105	117	126
GROUP III (Flexible)	16	52	56	72

(Mr. Downey showed 8 slides illustrating some of the practices mentioned in the first part of this paper.)

EXPERIMENTAL SHOULDER STABILIZATION

Report of Bureau of Materials
Division of Highways
Illinois Department of Public Works and Buildings

PURPOSE - Inasmuch as the shoulders are an essential part of the highway, it is necessary that they be firm so that vehicles may stop in an emergency out of the way of other traffic. The purpose of this experiment is to develop a method of stabilizing earth shoulders by mixing soil with granular materials and at the same time provide conditions under which desirable turf grasses would have an active growth.

While other methods of shoulder construction have been tried with some success, the main idea in connection with the stabilized turf shoulders was to build stability and retain beauty in the roadway; in other words, provide simultaneously a relatively high load-supporting value in the shoulder and a shoulder surface that would lend itself to the problem of landscaping, especially on the express highway system.

This experiment was a joint project, the participating agencies being the Cook County Department of Highways, the Bureau of Public Roads, and the Illinois Division of Highways.

LOCATION OF EXPERIMENT - The experiment is located on a section of portland-cement concrete pavement, designated as Section 100-1011, F.A.S. Route 113, F.A. Project S-128 (1), Cook County; this section is on the Lake-Cook County Line Road just west of Rand Road. The experiment extends from Station 207+00 to Station 226+75, from 1,600 to 3,600 feet west of Rand Road.