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TOP DRESSING OR DRY MAINTENANCE ROADS

C N Conner
Highway Research Board

The following is a résumé of publications, correspondence, conferences and field inspections. It includes:

General Description, Materials, Construction Methods, Maintenance Methods, Costs and Service.

This type of construction has been used with success.

Case I. On previously graded but unsurfaced subgrades.

Case II. As a method of resurfacing and widening an existing untreated surface

The construction methods are similar in each instance, except that more material will be required in Case I .

1 GENERAL DESCRIPTION

The surfacing is a layer of clean crushed stone, slag, crushed or screened gravel evenly spread on the prepared subgrade

This layer is kept smooth by constant grading Traffic gradually compacts it from the subgrade upward

New material is added under traffic, periodically, until a crust of uniform thickness is built up This crust is seldom more than 5 or 6 inches in depth after a period of several years It is kept covered at all times with a loose layer of the same materials as are in the crust

The surfacing should preferably extend from shoulder to shoulder This distance should not be less than 20 feet, 30 feet is better

The crown should be flat, about 1/4 to 3/8 inch per foot This has been found sufficient It is easier to maintain, to ride upon, there is less erosion, and it needs no building up or cutting down when used as a base for future surface courses or surface treatments

2. MATERIALS

The materials are hard, crushed stone or slag, crushed or screened gravel Other materials have been used, such as stone screenings, pea gravel and cinders They are not included in the body or conclusions of this report The use of large sizes of gravel and stone should be discouraged

Best all-round results have been obtained when the materials all pass the 1-inch or 7/8-inch screen, with little passing the 1/4-inch and retained on the No 10 sieve Crusher run below 1 inch has also been used Riding qualities are improved, and tire wear probably reduced, when the maximum size is 1/2 or 3/4 inch

Materials over 1 inch and up to 1 1/2 inches have been used with success, but the surface is rougher and tire wear probably greater

An excess of fines may cause corrugations in gravel roads. They will become more dusty in all types under traffic

An excess of clay causes dust pot-holes and is a disadvantage in case of future surface treatments

Clay is sometimes necessary as a binder when screened uncrushed gravel is used It should be applied dry, evenly and sparingly.

3. CONSTRUCTION METHODS

After the subgrade has been prepared, the surfacing material is uniformly spread over it. There are several methods: One of the most satisfactory is to dump the surfacing in a continuous pile along the center of the roadway or in two piles, one on each side It is then bladed over the roadway in a smooth layer of uniform depth of from 2 to 4 inches, depending on the character of and moisture in the subgrade.

Traffic and the hauling of surfacing material compact this first layer It is continually bladed and dragged to a smooth surface without ruts and potholes

As the first layer becomes compacted, more material is added, so that a loose mulch from ½ to ¾ inch deep is present at all times.

4 MAINTENANCE METHODS

Maintenance methods are similar to the construction methods. They consist of the addition of new material This is usually applied when the road surfaces are wet, a condition permitting better bond with the old surface One-man patrol graders, with straight or spring blades, followed by an occasional planing with heavier equipment, have given excellent results.

In sections of the country subject to conditions of freezing and thawing, such as Ohio, Michigan, and Indiana, these surfaces may break through in places, especially during the first winter and spring

Repairs are simple and are made before the existing surfacing becomes lost in the subgrade Reducing the amount and weight of traffic during these periods has reduced the maintenance costs.

5. COSTS

For the first year the furnishing of surfacing material, when railway haul is not involved, applied on the road and maintained under traffic will cost from $1000 to $2000 per mile. The second year less surfacing will be required, and the cost will be $1000 or less per mile The third year the maintenance costs should not exceed $600 or $700 per mile.

6. SERVICE

The surfaces are economical for traffic up to 500 or 600 vehicles per day. In states having a low rainfall, economical traffic capacity would not exceed 200 to 300 vehicles per day. They will carry more traffic, but the cost of maintenance increases New surfacing must be added more frequently, and dust becomes a nuisance

They are smooth and comfortable to ride upon. Safe speeds of 40 to 50 miles per hour are limited only by grades and curvature

The surface mulch retards the formation of pot holes and corrugations. Crushed stone and slag have been used to prevent them on gravel bases

The principal objection to this type of surfacing is the wear on tires and rather high tractive resistance

After the road has been in service for 3 or 4 years it may be successfully treated with one of several satisfactory types of bituminous or non-bituminous surface treatments Its traffic capacity may then be doubled and dust eliminated.

Facts established by this investigation

1. That road service over a large mileage can be quickly furnished at a reasonably low cost with this type of construction and maintenance
2. Hard crushed stone, slag, crushed and screened gravel are satisfactory materials.
3. Sizes passing the 1-inch screen and retained on the No 10 sieve are satisfactory Better riding surfaces result when the surface mulch contains no material larger than ¾-inch
4. Construction and maintenance methods are simple They do not require expensive equipment or highly skilled labor.
5. A very smooth riding surface can be maintained
6. A loose surface mulch retards the formation of pot holes and corrugations, and tends to resist erosion
7. Roads of this type make an excellent sub-base for supporting other types of roads.

Strong indications are

1. That surfacing should reach from shoulder to shoulder, and be not less than 20 feet wide, 30 feet is better.
2. That a crown about ⅜ inch to the foot is sufficient.
3. That the best time to apply additional new material is while the existing surface is wet or moist

4. That loads should be reduced 25 to 50 per cent during the period when frost is leaving the ground.
5. That this type of surface will accommodate 500 to 600 vehicles per day except in arid regions.
6 That bituminous or non-bituminous surface treatments will increase the traffic capacity, and eliminate dust.
7 The mileage of this type is increasing.

Observations on costs and service by the various builders of these roads are the best sources for further information. There are no extensive research investigations in progress

Suggestions for further investigations are

1. Cost of vehicle operation on this type compared with roads of equal cost and service
2 What is the cost to a community to be without road service?
3 What is the traffic limitation of this type in cost per vehicle miles or per ton mile?
4 What types of surface treatments are economical investments?
5 What is the salvage value, as sub-base for future high type pavements?

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SEMI-GRAVEL, TOP-SOIL, AND SAND-CLAY ROAD MATERIALS

C M Strahan
University of Georgia

RÉSUMÉ OF PUBLISHED INVESTIGATION

Having limited this report to results with these road slabs obtained in Georgia, the body of the report will comprise in itself a résumé of the previously published work, most of which has emanated from the staff of the University of Georgia road laboratory