

# REPORT OF COMMITTEE ON MAINTENANCE OF ROADS BUILT ON STABILIZED BASES OF VARIOUS KINDS

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## SYNOPSIS

This Committee in its first report indicates general maintenance procedures along with the general advantages of stabilization to the life of the road. No data have been gathered that will give a comparison of the cost of maintenance between bases that have been stabilized and those that have not been. It is the belief of the committee members in their study of the work that there is a considerable difference and in future reports research will be directed along this line.

For the sake of brevity, stabilized bases will be considered in four groups in accordance with the road service they perform

### GROUP 1. STABILIZED BASES AND WEARING SURFACE OF THE SAME MATERIAL FOR LIGHT TRAFFIC

The purpose of such stabilization is to prevent disintegration or displacement of materials under traffic, thereby reducing the dust and mud to a minimum

Such bases and wearing surfaces are usually constructed of selected local material or prepared admixtures of graded aggregate of crushed stone, gravel, soil, sand, etc., with sufficient clay, silt or other bonding material to produce a dense mixture. To assist the bonding material in securing greater density and to keep the dust to a minimum, calcium chloride or sodium chloride is often added.

The maintenance of this group of stabilized bases and surfaces is similar in many respects to the maintenance on the ordinary dirt road. Care is necessary, in machining or dragging to prevent pulling additional clay or foreign matter onto the surface as such materials will break down the stability of the mixture. As the fines and bonding materials wear out of the surface, the coarser materials should be pushed to the side of the travelled way. If allowed to remain on the travelled way, these larger particles

have an abrasive effect under tire action. Experience indicates that if the road is built and maintained with a crown of about  $\frac{3}{8}$  in. to the foot, the loose material will work to the edge of the travelled way. This crown will also promote good drainage and to a great extent eliminate "rhythmic corrugations." Waters should not be allowed to pond as it will loosen the surface in spots and cause "pot holes." The occasional application of calcium chloride to the surface will prevent dust and the loss of much fine material.

### GROUP 2. STABILIZED BASES WITH A BITUMINOUS SURFACE TREATED WEARING COURSE

To prevent failure maximum stability, under a thin bituminous surface treated top, is most important. The method of selecting local materials by the "hit or miss" method is unreliable. Admixtures of aggregates in the proper gradation with a minimum amount of bonding materials are essential. Where coarser aggregates are not readily available, stabilization is often built into the base by the admixture of various bituminous materials or cement.

Regardless of the method of stabilization the bituminous surface treated wearing course must be sufficiently strong to prevent traffic wear of the base and at the same time thoroughly waterproof the top. A treatment that will admit surface water will most certainly cause failures

of the base Too much emphasis cannot be given to this one step of the original construction Retreatments must be made frequently enough to maintain the waterproofing qualities Prompt patching of all breaks or holes in the surface treatment must be done The shoulders of the road must be kept low to prevent ponding water from seeping into the base Subdrainage, where necessary, must be provided

#### GROUP 3 STABILIZED BASES AS SUBBASES UNDER HIGH TYPE PAVEMENTS

The principal purposes of stabilized subbases under high type pavements such as concrete, macadam, etc., are to eliminate capillary action, promote subdrainage and to increase the supporting properties of poor materials found in the grade Local materials carefully selected or various aggregates properly proportioned may be used

The important maintenance operation in connection with the subbase is to, at all times, provide adequate drainage away from beneath the pavement Should the shoulders of the road be built of dense material, such as clay, pipe drains or cuts, back-filled with gravel or stone, must be provided to carry the water from the base to the side ditches Some States in order to promote adequate drainage from the subgrade to the side ditches, construct the shoulders of porous material

#### GROUP 4 THE STABILIZED BASES AS A STEP IN STAGE CONSTRUCTION

Some states have built many miles of road by "Stage Construction" The method generally followed is to surface the newly graded road with selected gravels, soils, or properly graded aggregates to secure maximum stability A bituminous surface treatment is then added and maintained the same as indicated under Group 2 Under moderately heavy traffic such surfaces and

bases stand up well and give many years of service. If and when traffic does increase, a higher type surface such as concrete or macadam may then be laid on top, in which case the original surface performs as a stabilized subbase

The outstanding advantages of "Stage Construction" of this type are; (1) The grade has had an opportunity to settle and consolidate before the high type surface is laid, (2) weak places that develop in the grade are located and corrected, (3) sections with poor drainage become evident and may be corrected, (4) and last but not least, during the laying of the new surface it is not necessary to detour traffic off the main line By shuttling traffic on one half of the road at the point of operation there is seldom more than a slight delay

#### CONCLUSION

Research and field practices have established the fact that by definite admixtures of aggregates maximum stability can be produced Also, by the addition and mixing of predetermined quantities of certain types of bituminous materials or by the addition and mixing with cement stability can be greatly increased in various soils

The more stable the base, the longer the life of the pavement Naturally the maintenance costs will be less on a stable base than on one that is not stable

It has been indicated that prompt patching of all surface breaks is essential because water admitted from the top combined with wheel action will cause any type of road to fail Should a general breakup occur, due to severe freezing and thawing conditions, under heavy traffic, stabilized roads (See Groups 1 and 2) are quickly and cheaply reconditioned by scarifying and resurfacing with very little inconvenience to traffic, with the possible exception of bases stabilized with cement Additional selected local or properly proportioned

materials may be added, which will, if properly mixed with the material already in the road, increase the stability. Soil tests of the material in the road easily predetermines the type and quantity of additional material necessary to add. Retreatments with bituminous materials are necessary when the old treatments

dry out or break up. The only maintenance indicated for stabilized bases in Groups 3 and 4 is proper drainage.

In Virginia, and I am sure the same is true in many other states, the performance of high type surfaces laid on stabilized bases more than justifies the additional cost.

#### DISCUSSION ON MAINTENANCE OF ROADS ON STABILIZED BASES

MR. C. N. CONNER, *Public Roads Administration*: Drainage was mentioned as being important in stabilization of the roads. I wonder if the Committee at any time has considered the advantages of raising the grade to a relatively slight fill perhaps over bad soils, compared with the cost of relatively expensive aggregate

for subgrade treatment or for pipe in connection with coarse aggregate.

MR. MILLS: That is another problem the committee has not had a chance to study yet. We will consider that during the coming year.