surface. The American people are speedminded, and they will not take no for an answer. Speed is the greatest contributing factor to road damage and deterioration. Quick starting and stopping, violent turns and use of brakes with their grinding and pulverizing effect, make imperative the need for a well-drained, solid subgrade and a smooth firm surface.

The building of roads capable of sustaining present-day traffic is a comparatively new field of endeavor for engineers, road builders, and commissioners. The demands of the motoring public present difficulties and problems the like of which have never before been known. Much has been accomplished, but we still have quite a long way to go. However, we may rest assured that the ingenuity and initiative of our roadmen will solve these problems.

SOIL-CEMENT BASE STABILIZATION

Ralph Witt,
St. Joseph County Surveyor

There is a growing interest in soil-cement stabilization for several reasons. Materials are more expensive, transportation has in many cases become a major factor, some types of road material are practically unobtainable, and that important word "priority" is becoming more effective daily. There is another problem that may seriously affect road maintenance as well as new construction. The restrictions on tires and automobiles will reduce gasoline consumption with a resulting drop in the gasoline-tax revenue far below normal anticipation. We must, therefore, carefully study and plan all types of road work in the light of these new developments.

Defense roads are taking the spotlight and very little new construction will be done that is not of this type. The cost of the project may not be the final governing factor. In some localities aggregates are scarce or non-existent. In many counties where local deposits of aggregate are not available, soil-cement roads will undoubtedly be a cheaper type to build. It is reasonable to assume that any type of road utilizing materials at hand will be less expensive than a type requiring the purchase and shipment of aggregate.

In our county we have plenty of local aggregate reasonably accessible to all parts of the county. As later figures will show, we can build a cheaper type of road. But, since all counties in Indiana do not have an abundance of aggregate, I believe our experience with soil-cement will be of interest to this group.

CONSTRUCTION METHODS

Detailed specifications are available from several sources. The City of South Bend has a complete set of specifications to
cover this type of construction. In brief, the work is as follows:

1. Scarify the roadbed to the depth and width required.
2. Thoroughly pulverize this scarified material with a blade-grader, spring-tooth harrow, or other similar equipment.
3. In the absence of a curb, use planking for edge control.
4. In accordance with soil tests made before actual construction, place the percentage requirement of cement, in bags, in rows on the road surface.
5. Place no more cement on the road than can be compacted in one continuous run.
6. Mix the cement well into the dry material of the roadbed.
7. Using a pressure distributor, then place water on the mixture in a predetermined quantity.
8. Make a thorough mixture of water, cement, and road material.
9. Then compact the roadbed with a sheepsfoot and rubber-tired rollers.
10. Blade the surface to grade and crown desired.
11. Make the final compaction with a 10-ton, flat-wheel roller.
12. Cover the road and allow it to cure. Permit no traffic until in the judgment of the engineer it is allowable.
13. Apply a seal coat as soon as the road has “set up”.

The seal coat, in some cases, has been an additional amount of cement placed on the surface and allowed to mix with the upper two inches of the soil-cement mixture. A seal of asphalt or tar can be applied with proper covering aggregate. Drainage must be provided.

The tests referred to are:

Moisture-Density Relations of Soil-Cement Mixture ASTM D 558-40T (Tentative).
Wetting and Drying Test of Compacted Soil-Cement Mixture ASTM D 559-40 (Tentative).
Freezing and Thawing Test of Compacted Soil-Cement Mixture ASTM D 560-40T (Tentative).

We specified a six-inch compacted base, and .45 sack of cement per square yard was used as an initial figure. However, the cement content varied somewhat because of local conditions, which were checked continuously as the work progressed. The Portland Cement Association had an engineer on the job at all times.

**Cost**

The cost of this project was rather high, but considering the amount of grading done, it was not excessive. The project covered 17,400 lineal feet. Total cost was $59,710.49, with the
county furnishing about $14,000 in contribution credits, or roughly 25 per cent. The cost per mile was $18,094. Eliminating the WPA costs and practically all the trimming up of the job, the cost can be cut to about $4,000 per mile.

For a road designed to carry all kinds of traffic and to reduce initial cost, soil-cement is a type worth consideration. There are cheaper types, but I feel that experience will show that the difference in initial cost may be offset by long-term cost.

THE VALUE TO A ROAD DEPARTMENT OF REGULAR MEETINGS, PICNICS, ETC.

Ernest H. Coffin,
Wayne County Highway Supervisor

I have attended the Road School for the past twelve years and have been on the Program Committee for the last six or seven years. And if my memory serves me right, this is the first time that a subject of this nature has been on the program.

Always I have held to the idea that if a County Highway Department was to attain any degree of success, it would be in a large measure because of the efficiency of the employees. If this be the case, I will consider the subject in a broad way and take it to mean anything that will help improve the efficiency of the organization.

I presume all of you at some time have been the head, or at least a part of, some sales organization or other organized group and have tried to apply some of the ideas accumulated there to your present task.

I spent four years with a large motor company; and while I do not approve of a lot of its "driving" ideas, yet I am sure I did receive some good education from these four years of experience. Such things as sales meetings every morning, a sales meeting once a week for the service department, an entire organization group-meeting once a month, and keeping of prospect sales cards, service cards, and detailed records beyond number, can be translated into similar beneficial activities in highway organizations.

For four years I was with a large security company, an entirely different kind of organization. It had nothing tangible to sell, and yet there was a meeting of all employees each Wednesday for their education and the exchange of ideas for the betterment of the office and the employees.

Visit any going business concern and you will find it holding regular periodic meetings of all the employees for the one purpose of raising the efficiency of the group.

In a certain county seat in Indiana there is an outstanding restaurant. It uses no menus. You stop at this restaurant with the idea of buying a sandwich, but before you leave you very likely will have bought a full meal, because of the