Discussion of “The Value of Pavement Performance Surveys”

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In presenting his paper on “The Value of Pavement Performance Surveys”, Mr. Shelburne has, in a very thorough manner, emphasized the value which such studies have as a practical aid in the design and construction of highways. Although our present design and construction practices to a large extent, so far as the State Highway Department is concerned, are an evolution of former procedure and experiences which have brought about many noteworthy improvements; nevertheless, we recognize the fact that in some cases there has been a period in which we might not have realized the value which could have been derived from our existent highway system in determining the factors causing differences in performance of like pavement sections. However, all such surveys in the past could not have had as much value as those of recent date, primarily because a number of failures do not become evident until considerable time has elapsed.

As Mr. Shelburne has pointed out, the most critical period in the life of our pavements, particularly flexible types, is during the late winter and early spring. When the frost leaves the ground, moisture saturation is prevalent and break-ups occur. Accumulated information obtained from performance surveys made during this period of the year, when combined with other related research on treatment of subgrades, is of infinite value in determining the proper design for future construction. On analyzing the information obtained from these surveys, we find that a greater portion of the pavement failures occur in cut sections. In order to correct or prevent such failures, in most cases it is necessary to strengthen those sections, either by stabilizing the subsoil with the addition of granular material or other ingredients, thereby increasing the supporting power of the soil; by providing a well-drained porous insulation course beneath the pavement; or by increasing the thickness of the pavement.

In recent years, a considerable percentage of failure of rigid-type pavements has been caused by pumping action, which has taken place
because of the combination of certain factors, namely, types of soils, magnitude and frequency of loads, and amount of moisture in the sub-grade. Performance surveys are of infinite value as a means of showing the particular kinds of soils which contribute to such failures, as well as the effect that pavement design itself can have on the amount and degree of failure when pavements are placed on such soils. Unless preventive measures are taken, we can expect a greater amount of trouble of this nature from pavements of certain designs placed on these soils.

Blow-ups are another type of failure of rigid pavements. In 1934, the State Highway Departments were required to adopt the use of expansion joints. To my knowledge, I am not aware of any blow-ups that have occurred where expansion joints were used since that date. But we do know that in most cases we are getting a greater amount of failure in heavily-traveled roads placed on poor soils, where expansion is provided for, than we got from blow-ups on the same soils before we used expansion joints. This shows that where a certain change in design was employed to correct a previous ailment, a new difficulty arose more troublesome than the original. Though this be the case, I am not advocating the return to our previous design, but certain modifications that I believe might correct the situation. This is prompted by a performance survey made recently by the Joint Highway Research Project, which indicates that blow-ups are definitely associated with type and source of aggregates used. It is hoped that analyses of aggregates used in pavements where a great number of blow-ups have occurred will reveal the properties which tend to cause them. If this can be accomplished, we can then revise our specifications to take care of the matter.

It is my opinion that most highway engineers take great pride in their profession and are desirous of advancing the quality of their production. I also believe that they realize the value of performance surveys although they may not have recognized all angles. I feel sure that the Joint Highway Research Project staff or similar groups are doing an excellent work and can continue to be of invaluable service to highway engineers in pointing out things through research that can be used to give the public a better highway system.