

Discussion of Experimental Composite Pavements

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•FOR many years, New York City has used a portland cement concrete base, an asphalt concrete binder course and a sheet asphalt surface. Other cities have used somewhat similar designs. Highway departments have constructed many thousands of miles of composite pavements through stage construction techniques. When a portland cement concrete pavement becomes unserviceable, it is normally resurfaced with asphalt concrete.

In this latter example, however, the asphalt surfacing was placed primarily as a rehabilitation measure, to restore a satisfactory riding surface. It was not until a research program was initiated by the Corps of Engineers on airfield pavements that engineers began to realize that the load-supporting capacity of a pavement was substantially increased by means of these asphalt pavement overlays. Special field tests conducted at Lockbourne AFB, at Sharonville, Ohio, and elsewhere amply demonstrated this increase in load-supporting capacity.

As all highway design engineers know, the basic concepts used in the design of flexible and rigid types of pavement vary in a marked degree. It is likely that neither design concept will be fully adequate for the design of composite pavements. Yet, there are many who consider a composite type of pavement to be the most suitable for many situations. To serve these needs, there is a definite need for the development of adequate design procedures through construction of experimental sections so that the composite type of pavement can be adequately and economically designed.

It seems likely that mix design for the experimental sections for both the asphalt concrete and portland cement concrete used in a composite pavement may require some modifications from conventional practice. In all probability, a somewhat leaner portland cement concrete mix placed under less restrictive controls would be adequate. A somewhat harder grade of asphalt cement might be used for the asphalt concrete surface because deflections would be somewhat less than for conventional flexible pavements. These factors all serve to underline a need for the development of design procedures and for field verification of these procedures if the composite pavement is to be designed on an engineering basis.

The Corps of Engineers has developed and verified design procedures for composite airfield pavements. Recently, the Corps has proposed a modification of these procedures for use in highway design. It must be recognized, however, that these procedures are based primarily on wheel loadings of far greater magnitude than those encountered on highways. The AASHO Road Test has indicated that there are interactions between load and design. Therefore, design procedures based on extremely heavy airfield type loadings quite likely will require some modification for use on highways. Nevertheless, the Corps procedures afford a good "basing point" for the development and verification of design procedures for composite pavements for highways. Requirements indicated by the Corps procedures should first be compared with existing highway composite pavements of known performance. Studies of composite pavements now under way in England and Germany, as well as composite pavement sections constructed in the Illinois rehabilitation of the AASHO Road Test sections, will be most helpful in this respect. These comparisons should provide indications as to modifications in design procedures that may be required. Following these com-

parisons, a limited number of field test sections may then be required to provide verification of such modifications as may be indicated.

Finally, there is the matter of economics which may have a substantial bearing upon the acceptability and general use of the composite type of pavement. Performance vs cost studies must be made for such an evaluation. These studies, however, must await the development and verification of adequate design procedures and the accumulation of a reasonable quantity of in-service performance data.

In summary, it would seem that current needs are to compare design procedures proposed by the Corps of Engineers with performance of existing composite pavements. Following these comparison studies, there probably will be a need for additional field tests of experimental sections to verify such modifications in design procedure as may be indicated. Finally, cost vs performance studies must be made as a basis for establishing the position of this type of pavement in the overall highway program.