

MICHIGAN
STATE HIGHWAY DEPARTMENT
Charles M. Ziegler
State Highway Commissioner

THE RESEARCH LABORATORY

By

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Research Laboratory
Testing and Research Division
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The Michigan State Highway Department over a period of years has realized the value of research and has contributed valuable information to the art and science of highway building. Further evidence of the importance of research in the highway industry is manifested by the establishment of a separate organization by the administration for the express purpose of conducting certain research activities of the Department. This organization with laboratory facilities is located in Olds Hall of Engineering at Michigan State College. The College accorded to the Highway Department its facilities and certain space in the Civil Engineering Laboratories for carrying on the Department's research activities.

Purpose of Highway Research:

The specific objective of highway research is to raise the standards of the system's service by improving its physical facilities and increasing the efficiency of its operating methods. This objective in its different phases may require either fundamental or developmental research, but in either case it is conducted for one of the following reasons.

1. To reduce costs in methods of design, construction, maintenance or materials.
2. To improve the quality of the finished product by improvement in construction methods or materials.
3. To develop new types of highway and appurtenances.
4. To develop use or application of new materials or products.

Functions of the Organization:

The research organization has endeavored to maintain an adequate staff and the necessary equipment in order that it may perform the following functions.

1. To conduct experimental research pertaining to specific problems arising within the various engineering divisions of the Michigan State Highway Department.
2. To direct itself towards the solution of certain major problems of interest to the field of highway engineering in general.
3. To engage in cooperative research with other State Highway Departments and technical organizations interested in highway problems.
4. To take part and thereby representing the Department in the activities of the various engineering and technical societies.
5. To participate in developmental researches for the purpose of improving methods of highway design, construction methods and procedure, materials of construction and highway appurtenances.
6. To develop new materials for highway use.
7. To prepare specifications based on developed data resulting from special research investigations.
8. To accumulate and dispense technical data and literature pertaining to outside research activities, construction practices, etc., for the convenience and benefit of other divisions of the Highway Department.
9. To prepare technical papers and reports for members of the Highway Department outside of the Research Laboratory.
10. To act in an advisory capacity in regard to problems of mutual interest in the Department.

Research Program:

The research program is comprised of primary problems pertaining to higher quality concrete and bituminous pavements as well as subgrade investigations and soil stabilization. In regard to concrete pavements, special emphasis is being placed upon such subjects as scaling, curing, joint sealing, recapping, structural design including slab thickness, spacing of joints, joint design and concrete mix design with air entraining cements or agents. The changes in characteristics in binding media and consequent development of specifications for asphalt materials are being considered in connection with bituminous pavements. Subgrade and soil studies include measurement of subgrade modulus for

different soil types, methods of soil stabilization and turf growth on highway shoulders.

It is considered essential to construct test roads to serve as field laboratories to supplement the laboratory work. In this connection several field test projects have been completed during the last few years involving studies pertaining to the design and durability of concrete pavements, soil stabilization and vibrated concrete. The most outstanding field project completed and under study at the present time is nationally known as "The Michigan Test Road".

The Michigan Test Road was constructed by the Michigan State Highway Department in cooperation with the Federal Works Agency of the Public Roads Administration in 1940 on M 115 between US 10 and M 66 west of Farwell. The project consists of 17.6 miles of 22 foot concrete pavement in which are included the latest ideas in modern concrete road construction. A ten mile section of the test road is devoted to factors influencing concrete pavement design, while the remaining 7.6 mile section is concerned primarily with the scaling problem. The factor of major importance which has resulted from this program is the development of a scale resistant concrete by means of air entraining admixtures. On the basis of this development the Department now requires that air entraining admixtures must be used on all concrete paving projects with the view of reducing scaling or progressive disintegration to a minimum and thereby increase the economic life of new concrete pavements in Michigan.

Association with Technical Societies:

To keep abreast of the constantly expanding field of research and its relationship to highway problems, the research organization maintains active association with technical societies to obtain authoritative information on properties and tests of materials and to have available the latest data on highway research. In

return the organization is of service by sharing experience and knowledge on similar problems, by participating in programs of research, by constructive criticism of standards and by helping promote the use of quality specifications and standards of tests.

Public Relations:

The establishment of the Research Laboratory at Michigan State College has enabled the staff of the organization to participate in highway schools, conferences and educational activities on the campus and thus it has been given the opportunity to acquaint the students, faculty and guests of the College with the work of the laboratory as well as that of the Highway Department as a whole in their endeavor to provide the citizens of Michigan with a good highway system.

Accomplishments:

During the last four years over 40 separate reports have been completed by the Research Laboratory consisting of technical papers, specifications, recommendations and progress reports based on developed data obtained from its research activities.