

## REPORT OF COMMITTEE ON DESIGN

A T GOLDBECK, *Chairman*

*Director, Bureau of Engineering, National Crushed Stone Association*

The scope of activities of the old Committee on the Structural Design of Highways was enlarged at the beginning of the present year. Its work now includes not only the structural design of highways but also research on the design of structures and on the location, alignment and gradient of highways. This additional work now delegated to the Committee on Design has required a reorganization of the Committee and a reconsideration of its method of operation.

A general function of the Highway Research Board, to be performed by its various committees, is to serve in a cooperative manner as a coordinator of highway research. One phase of this service embodies the coordination of research results, to the end that conclusions may be published, and made available for use in actual practice. Another phase of service, embodies the study and digest of many live highway problems arising in various localities and in different fields of highway work—and as a result of such study and digest, the suggesting of needed additional research.

During the past several years data have become available for review by the Design Committee and the reports of this Committee have consisted largely either of a description of original researches, or a compilation of the results of researches performed by various agencies in different fields of highway design.

This year the Committee has taken up in some detail its second important function, namely, the suggesting and outlining of several tentative needed researches which might be undertaken by various agencies.

For expediting its work, the Committee is divided into a number of sub-committees as follows:

- I Grading, Subgrade and Drainage
- II The Effect of Traffic on Design
- III Climate and Hydrography
- IV Road Types
- V Structures
- VI Location, Alignment and Gradient
- VII Miscellaneous

Three well-attended meetings of the Committee have been held during the past year and, in addition, a great deal of work has been done by

the various sub-committees. The following research projects have been outlined for the purpose of pointing out to various agencies the problems most in need of research in the design field and indicating also the methods which might be used in undertaking them.

- 1 Grading
- 2 Stabilization of Subgrade Treatments
- 3 Correlation of Physical Soil Tests with the Soil Types Established by the U S Bureau of Chemistry and Soils
- 4 Effect of Traffic on Rigid Pavements
- 5 Study of the Relation Between Excessive Rainfall and Extreme Flood Flow, Frequency Studies of Both as Affecting Highway Design
- 6 A Study of Temperature as Affecting Highway Construction.
- 7 Stream Stabilization and Control
- 8 Relative Depth of Ground Freezing in Various Parts of the United States, Including Effect of Elevation and Other Modifying Characteristics
- 9 Bituminous Mastic Mixtures for the Cushion or Bedding Course Under Brick Pavements
- 10 Bituminous Fillers for Brick or Block Pavements
- 11 Concrete Base Courses
- 12 Stresses Caused by Volume Changes in Concrete
- 13 Strength of Concrete Best Suited in a Concrete Base That is to Carry a Bituminous Wearing Surface
- 14 Relative Effectiveness of Various Non-Skid Surfaces for Bituminous Pavements
- 15 Design of Bituminous Paving Mixtures to Resist Cracking Due to Temperature Variations
- 16 Low Cost Road Types, Accelerated Tests of Untreated Surfaces
- 17 Low Cost Road Types, Accelerated Tests of Bituminous Surface Treatments
- 18 Low Cost Road Types, Aggregates for Bituminous Surfaces
- 19 A Study of Stresses in Road Slabs by Means of Models
- 20 Data on Traffic Loading as Affecting Structural Design of Highway Bridges
- 21 Determination of the Causes of Structural and Material Defects in Existing Structures
- 22 Economic Considerations in Design of Low Cost Bridges
- 23 Behavior of Concrete Structures During the Strength Developing Period.

In outlining research projects on the above topics, the committee thought it unnecessary to go into considerable detail with regard to the methods of procedure, since the detailed procedure cannot well be completely described in advance. It often becomes necessary to revise a

procedure after the research once gets under way. Moreover, the method is frequently governed by the type of equipment available and by the personnel of the research agency.

The following is a typical project statement as outlined by the Committee and the other research projects on the various subjects considered are outlined under the same general headings as given in this statement.

PROJECT NO. 14 STRENGTH OF CONCRETE BEST SUITED IN A CONCRETE BASE THAT IS TO CARRY A BITUMINOUS WEARING SURFACE

I. Object

1 Reasons for Investigation

a Excessive cracking in concrete bases which carry through top surfacing

2. Information Desired.

a Effect of Strength in concrete base on integrity and stability of wearing surface.

II Review of Existing Information (and work in progress). Recent Researches in Portland Cement and their Application to the Design of Bases for Asphalt Pavements, by Roy M Green, Proceedings Sixth Annual Asphalt Paving Conference 1927 Proceedings of A S M I, A S T M, A C I, Am R B A Engineers and Engineering, (Phila.) June, 1930 Bates Test Road, Ill

III Scope and Procedure

1 It is believed that the problem can best be studied by means of field tests

2 Required

a Uniform subgrade conditions

b Uniform thickness of concrete base

c Uniform wearing surface

d Experimental section in region where wide variance in temperature may be expected

e Mixture varied to produce concrete of varying strengths

f Frequent observations made on condition of pavement—cracking

3 If desired

(a) Trial of joint in concrete base with or without slip plate at joint

(b) Trial of reinforcement in concrete base

IV. Suggested Research Agencies

State Highway Departments

Bureau of Public Roads

Bureau of Highways, Manhattan, New York City

It is the hope of the Design Committee of the Highway Research Board that project statements such as the Committee has outlined will serve the purpose of showing the research agencies what researches are considered most important in the design field at the present time. Likewise they indicate the information which now exists and also the method of procedure which the Committee believes will be most productive of results. Before any one of these projects is started a more detailed outline will have to be prepared and whenever a research agency undertakes any of these projects, the Design Committee will be glad to assist it in arranging the details of procedure to be followed.

Through this initiation of research, data should become gradually available for the later consideration of the Design Committee whose function it will then be to coordinate the results obtained and to report them in a manner such that they may readily be worked into current practice.