

ENGINEERING BULLETIN

**OF
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**Proceedings of the
18th Annual HIGHWAY
GEOLOGY SYMPOSIUM
April 20 and 21, 1967**

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**Proceedings of the 18th
Annual Highway
Geology Symposium
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Sponsored by
Purdue University and the
Indiana Highway Commission

Proceedings Edited by
T. R. West and E. J. Yoder

Purdue University • Lafayette, Indiana

Purdue University is one of 68 land-grant colleges and universities which owe their origin to the Land-Grant Act of 1862, otherwise known as the Morrill Act. Three years after its passage, the General Assembly of Indiana voted to avail itself of the provisions of this act and began preliminary plans for a school devoted primarily to the agricultural and mechanical arts.

In 1869 the Assembly voted to accept a gift of land and money from John Purdue and other generous Lafayette citizens and, in appreciation, declared the name of the new institution to be Purdue University. The University is supported mainly by state appropriations, supplemented by federal grants.

Actual instruction began in 1874 with 39 students and a faculty of six. Today Purdue conducts classes and research in more than 70 principal buildings and controls over 7,000 acres of land.

Undergraduate and graduate instruction is offered in agriculture (including agricultural engineering); aeronautical and astronautical engineering, chemical engineering, civil engineering, electrical engineering, engineering sciences, industrial engineering, mechanical engineering, materials science and metallurgical engineering, nuclear engineering; industrial management; home economics; pharmacy and pharmaceutical sciences; science; humanities, social science, and education; technology; and veterinary science and medicine.

Extensive experiment stations in both engineering and agriculture are maintained by the University. The Cooperative Extension Service provides a pipeline to the people of the latest scientific and technical information. Courses with credit toward a college degree and a two-year Diploma in Applied Technology are offered at regional campuses. The principal ones are in Fort Wayne, Indianapolis, Hammond, and Westville. A variety of courses is also offered through the adult education programs sponsored by the University.

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Preface

The 18th Annual Highway Geology Symposium was co-sponsored by Purdue University and the Indiana Highway Commission. The Symposium included a one-day field trip in northern Indiana followed by technical sessions the following day. During the field trip, pavement performance and soil conditions were observed; the limestone quarry at Kentland, Indiana, was also visited.

Ten papers were presented during the technical sessions of the Symposium. This volume contains the papers in the order in which they were presented at the meeting. The Co-chairmen are indebted to the authors for their contributions to the program. Special thanks are also extended to Mr. A. C. Dodson, Chairman of the National Steering Committee of the Highway Geology Symposium, for his assistance as Chairman of one of the technical sessions.

A panel discussion on subsurface investigations in the states of Indiana, Ohio, and Illinois was presented during the afternoon technical session. Dr. C. W. Lovell, Jr. of the School of Civil Engineering at Purdue University, served as panel moderator. His efforts in the organization and direction of the panel discussion are acknowledged. The panel discussion was recorded on tape, subsequently transcribed, and appears in these Symposium notes following the formal papers.

The two-day meeting was concluded with a banquet. Dr. G. A. Leonards, Head of the School of Civil Engineering, presented a talk at the banquet on the Aswan High Dam.

The co-chairmen wish to express their gratitude to Dean M. B. Scott for his welcoming remarks and services as banquet Master of Ceremonies, and to Professor R. D. Miles and Mr. C. F. Hotler for their aid and guidance on the field trip.

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18th Annual Highway Geology Symposium

Some Highway Problems of the United States Correlated with Physiographic Provinces

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ABSTRACT

This paper presents a summary of some of the work which has been underway at Purdue University in the School of Civil Engineering for more than 25 years. Emphasis is placed on Physiographic regions of the United States, which in some instances have been modified for engineering. A major attempt is made to show the correlation between such regions and all kinds of highway problems which in the broad sense are really Civil Engineering problems.

INTRODUCTION

It is the purpose of this paper to describe in some detail a physiographic region -- in this instance, Interior Low Plateau Province -- with considerable emphasis on highway engineering problems and their solutions. These problems will be discussed in the light of contrasting problems of adjacent physiographic regions such as the Central Till Plains Section to the north, the East Gulf Coastal Plain Section to the southwest, the Ozark Mountain Province to the west, and the Appalachian Plateau Province to the east and south.

Only one physiographic province is covered in detail with the hope that comparisons of regional problems will be of sufficient contrast to indicate the need of the regional concept with respect to highway location, design, construction, and operations.

BACKGROUND

In the mid 30's, as Soils Engineer for the Ohio Department of Highways, the author read an article by H. F. Janda (1) in which he related concrete pavement performance to a particular soil area in Wisconsin which had been mapped for agricultural purposes. Eno in Ohio, had been experimenting with the same idea (2) and in addition, he had performed early field experiments in the uses of base courses in certain soil areas of Ohio. In 1943, Belcher, Gregg, and Woods (3) reported on the regional concept of the soils and outcrops of Indiana. In 1945, Jenkins, Belcher, Gregg, and Woods (4) pre-

