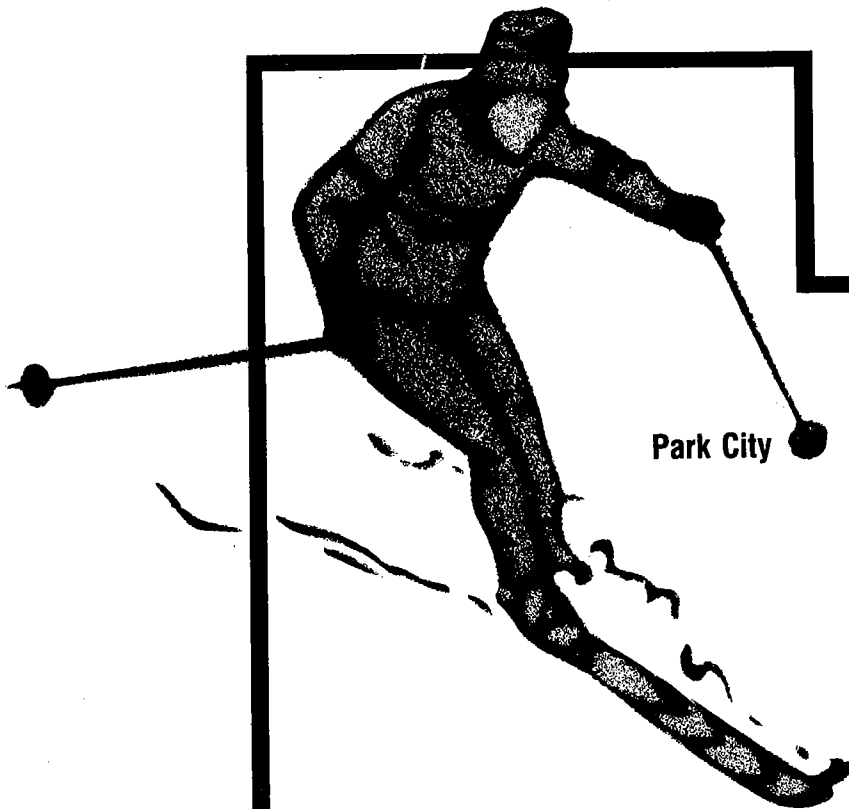


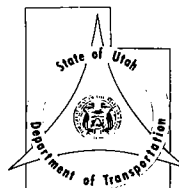
# Proceedings of the 39<sup>th</sup> Highway Geology Symposium



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Utah DOT



BRIGHAM YOUNG  
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**Park City, Utah  
August 17-19, 1988**

PROCEEDINGS OF THE 39TH ANNUAL  
HIGHWAY GEOLOGY SYMPOSIUM  
CONSTRUCTION TO MINIMIZE ENVIRONMENTAL IMPACT

SYMPOSIUM VENUE

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UTAH DEPARTMENT OF TRANSPORTATION

UTAH GEOLOGICAL AND MINERAL SURVEY

ORGANIZING COMMITTEE

T. LESLIE YOUD, CHAIRMAN, BYU

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## HIGHWAY GEOLOGY SYMPOSIUM

### History, Organization, and Function

Established to foster a better understanding and closer cooperation between geologists and civil engineers in the highway industry, the Highway Geology Symposium was organized and held its first meeting on February 16, 1950, in Richmond, Virginia. Since then, 37 consecutive annual meetings have been held in 24 different states. Between 1950 and 1962, the meetings were held east of the Mississippi River, with Virginia, Ohio, West Virginia, Maryland, North Carolina, Pennsylvania, Georgia, Florida, and Tennessee serving as the host states.

In 1962, the Symposium moved west for the first time to Phoenix, Arizona. Since then, it has rotated, for the most part, back and forth from east to west. Following meetings in Texas and Missouri in 1963 and 1964, the Symposium moved to Lexington, Kentucky in 1965, Ames, Iowa in 1966, Lafayette, Indiana in 1967, back to West Virginia at Morgantown in 1968, and then to Urbana, Illinois in 1969. Lawrence, Kansas was the site of the 1970 meeting, Norman, Oklahoma in 1971, and Old Point Comfort, Virginia the site in 1972.

The Wyoming Highway Department hosted the 1973 meeting in Sheridan. From there it moved to Raleigh, North Carolina in 1974, back west to Coeur d'Alene, Idaho in 1975, Orlando, Florida in 1976, Rapid City, South Dakota in 1977, and then back to Maryland in 1978; this time in Annapolis. Portland, Oregon was the site of the 1979 meeting, Austin, Texas in 1980, and Gatlinburg, Tennessee in 1981. The 1982 meeting was held in Vail, Colorado, and in Stone Mountain, Georgia in 1983. The 35th meeting in 1984 was held in San Jose, California and the 36th HGS was in Clarksville, Indiana. This year's meeting, the 37th, was held in Helena, Montana, the capital of the Big Sky Country.

Unlike most groups and organizations that meet on a regular basis, the Highway Geology Symposium has no central headquarters, no annual dues, and no formal membership requirements. The governing body of the Symposium is a steering committee composed of approximately 20 engineering geologists and geotechnical engineers from state and federal agencies, colleges and universities, as well as private service companies and consulting firms throughout the country. Steering committee members are elected for three-year terms, with their elections and re-elections being determined principally by their interests and participation in and contributions to the symposium. The officers include a chairman, vice chairman, secretary, and treasurer, all of whom are elected for a two-year term. Officers except for the treasurer may only succeed themselves for one additional term.

A number of three-member standing committees conduct the affairs of the organization. Some of these committees are: By-Laws, Public Relations, Awards Selection, and Publications. The lack of rigid requirements, routing, and the relatively relaxed overall functioning of the organization is what attracts many of the participants.

Meeting sites are chosen two or four years in advance and are selected by the Steering Committee following presentations made by representatives of potential host states. These presentations are usually made at the steering committee meeting which is held during the Annual Symposium. Upon selection,

the state representative becomes the state chairman and a member protem of the Steering Committee. Depending on interest and degree of participation, the temporary member may gain full membership to the Steering Committee.

The symposia are generally for two and one-half days, with a day-and-a-half for technical papers and a full-day for the field trip. The symposium usually begins on Wednesday morning. The field trip is usually Thursday, followed by the annual banquet that evening. The final technical session generally ends by noon on Friday.

The field trip is the focus of the meeting. In most cases, the trips cover approximately from 150 to 200 miles, provide for six to eight scheduled stops, and require about eight hours. Occasionally cultural stops are scheduled around geological and geotechnical points of interest. In Wyoming, the group viewed landslides in the Big horn Mountains; Florida's trip included a tour of Cape Canaveral and the NASA space installation; the Idaho and South Dakota trips dealt principally with mining activities; North Carolina provided stops at a quarry site, a dam construction site, and a nuclear generating site; in Maryland the group visited the Chesapeake Bay hydraulic model and the Goddard Space Center; the Oregon trip included visits to the Columbia River Gorge and Mount Hood; the Central Mineral Region was visited in Texas; and the Tennessee trip provided stops at several repaired landslides in Appalachia. The Colorado field trip consisted of stops at geological and geotechnical problem areas along Interstate 70 in Vail Pass and Glenwood Canyon, while the Georgia trip in 1983 concentrated on highway design and construction problems in the Atlanta urban environment. The 1984 field trip had stops in the San Francisco Bay area which illustrated the interaction of fault activity, urban landslides, and coastal erosion with the planning, construction and maintenance of transportation systems. In 1985 the one day trip illustrated new highway construction procedures in the greater Louisville area. The 1986 field trip was through the Rockies of recent interstate construction in the Boulder Batholith. The trip highlight was a stop at the Berkeley Pit in Butte, Montana, an open pit copper mine.

At the technical sessions, case histories and state-of-the-art papers are most common with highly theoretical papers the exception. The papers presented at the technical sessions are published in the annual proceedings. Some of these proceedings are out of print, but copies of most of the last sixteen proceedings may be obtained from the Treasurer of the Symposium, David Bingham, of the North Carolina Department of Transportation in Raleigh 27611. Costs generally range from \$5.00 to \$15.00, plus postage.



# Highway Geology Symposium

## MEDALLION AWARD WINNERS

Hugh Chase	1970
Tom Parrott	1970
Paul Price	1970
K. B. Woods	1971
R. J. Edmonson	1972
C. S. Mullin	1974
A. C. Dodson	1975
Burrell Whitlow	1978
Bill Sherman	1980
Virgil Burgat	1981
Henry Mathis	1982
David Royster	1982
Terry West	1983
Dave Bingham	1984
Vernon Bump	1986

In 1969, the Symposium instituted an awards program, and with the support of Mobile Drilling Company of Indianapolis, Indiana designed a plaque to be presented to individuals who have made significant contributions to the Highway Geology Symposium over a period of years. The award, a 3.5" medallion mounted on a walnut shield and appropriately inscribed, is presented during the banquet at the Annual Symposium.



# Highway Geology Symposium

## STEERING COMMITTEE MEMBERS

	<u>Term Expires</u>
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Mr. Burrell S. Whitlow, President Geotechnics, Inc. 321 Walnut Avenue (P.O. Box 217) Vinton, VA 24179 Phone - (703) 344-4569; 344-0198	1989
Mr. Terry L. Yarger 1107 Woodbridge Drive Helena, MT 59601	1991



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# Highway Geology Symposium

39TH ANNUAL HIGHWAY GEOLOGY SYMPOSIUM

AUGUST 17-19, 1988, PARK CITY, UTAH

## ORGANIZING COMMITTEE

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A BRIEF OVERVIEW OF THE GEOLOGY OF UTAH  
Hellmut H. Doelling  
Senior Geologist, Mapping Section  
Utah Geological and Mineral Survey

INTRODUCTION:

Utah is a showcase geologic state, one where geologic phenomena are well displayed. Most transportation routes, especially in Utah, were developed because of the pristine geologic or geographic conditions that existed when the land was explored, settled, and developed. Utah is a state with many natural barriers to transportation, including mountain ranges, deeply incised canyons, monoclinical ridges, lengthy cliffs, and interior drainage mud flats. Utah can naturally be divided into three physiographic provinces: Basin and Range, Central Rocky Mountains, and Colorado Plateaus (figure 1). Each of these physiographic provinces displays a separate style of geology--in its stratigraphy, sedimentation patterns, and structure types. The province areas have been present for the last billion years and the boundaries that divide them have been present the same length of time. The boundary that divides the Basin and Range from the other two provinces has been very important throughout geologic time and has been called the Wasatch line, Wasatch hinge line, or Basin and Range-Colorado Plateau transition zone, among others. I don't mean to imply that the Basin and Range has always been a Basin and Range physiographic province, or that the Central Rocky Mountains have always been high mountain ranges, or that the Colorado Plateaus were always plateaus. I am implying that geologic environments and conditions across the lines were generally different throughout geologic history.

GEOLOGIC HISTORY:

Figure 2 is a generalized geologic map of Utah from Tooker and Stewart (1969). Starting in latest Precambrian time and continuing throughout the Paleozoic Era (900 to 245 million years ago), Utah was usually covered by an ocean; the area of the Basin and Range differed from that of the Central Rockies and Colorado Plateaus by subsiding and receiving sediments at a much greater and more continuous rate. In western Utah greater thicknesses of rocks were deposited than to the east, even though the entire state received mostly marine sedimentation,. In technical terms the rocks of the west were deposited in a miogeocline while the rocks to the east were deposited on a continental shelf. At times the sea or ocean retreated somewhat and placed the shoreline very near the present Wasatch hinge line. Then sediments were received only in western Utah and erosion may have occurred in eastern Utah. The Ordovician and Silurian periods lasted from 505 to 408 million years ago, and are not represented by rocks in eastern Utah. Starting 350 million years ago (Mississippian time) basins began to be formed on both sides of the Wasatch hinge line, but the basins that developed to the west received more and thicker layers of sediment than those in the