

## PREFACE

The Papers and Information contained in this Proceedings Volume were presented at the 35th Annual Highway Geology Symposium and Field Trip held on the campus of San Jose State University in San Jose, California, August 15-17, 1984. The theme of the conference was "Geotechnical Problems Associated with Transportation Routes on a Major Plate Boundary". This theme was selected to emphasize the difficulties that engineers and geologists have in dealing with the problems of planning, designing and constructing in areas characterized by active faults, evolving (often unstable) topography, and active shorelines. The conference brought together more than 100 scientists and engineers from various parts of the United States to share new information and ideas.

During the conference, 17 papers were presented. Eleven of these papers are in this volume. The abstracts of six presentations are included because a complete paper was not available.

In order to make the Proceedings available as quickly as possible, authors were requested to submit camera-ready manuscripts. The compilers of this volume have not edited the papers and the papers appear as submitted. All of the papers contain new ideas or perspectives, and it is hoped that they will stimulate new thinking and new approaches to solving the problems

associated with the complex interaction of geology and  
transportation routing.

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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 was held in San Jose, California.

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. They may 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, routine, and the relatively relaxed overall functioning of the organization is what attracts many of the participants.

## 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, 35 consecutive annual meetings have been held in 23 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 to the 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

Meeting sites are chosen two to 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 pro tem 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 of 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, constructing, and maintaining of transportation systems.

At the technical sessions, case histories and state-of-the-art papers are the most common. Highly theoretical papers are the exception. The papers presented at the technical sessions are published in the annual proceedings. Some of the proceedings are out of print, but copies of most of the last fifteen 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 \$12.00, plus postage.

\*HIGHWAY GEOLOGY SYMPOSIUM

Medallion 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
David Bingham	-	1984

\*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.

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35th ANNUAL HIGHWAY GEOLOGY SYMPOSIUM

August 15-17, 1984  
San Jose, California

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The Geotechnical Setting of the San Jose

Area, California

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Abstract

The greater San Jose area, in the southern portion of the San Francisco Bay region, is typical of many parts of California in terms of the geologic hazards and difficulties that must be overcome to satisfactorily plan, construct, and maintain a transportation system. Resistant geologic materials in combination with recent tectonic events have created northwest-southeast topographic barriers that must be breached. The many active faults of the area have the potential to cause damage because of ground shaking, ground displacement, and ground failure. Landslides, partially the result of the tectonically weakened rocks and steep slopes, are threats to the transportation corridors. Ground subsidence because of groundwater withdrawal, erosion by wave action, flooding because of combined rainfall runoff and high tides, and tsunamis are water related problems in the region. The mapping in detail of geologically hazardous areas, combined with a better understanding of the mechanics of geologic processes should

permit better planning, construction, and maintenance of modern transportation systems.

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This paper is designed to be an introduction to the general geotechnical setting for the greater San Jose area and it will serve as background for the other papers in this volume. This area is outlined on the location map (Figure 1) and is in Santa Clara County at the southern end of the San Francisco Bay region.

The San Francisco Bay area is in the California Coast Ranges Physiographic Province bordered on the east by the Great Valley Province, on the west by the Pacific Ocean, and to the south by the Transverse Ranges (Figure 2). The Coast Ranges Province is characterized by northwest-southeast trending subparallel mountain ranges rising in elevation to approximately three thousand feet. These ranges are separated by short discontinuous valleys, the Santa Clara Valley being a somewhat larger than average example. The province's southern border, the Transverse Ranges, is characterized by an east-west strike of the geologic structures. Figure 3 illustrates the rugged topography of the Santa Cruz Mountains and the San Francisco Peninsula which is crossed by the San Andreas fault (the plate boundary separating the Pacific plate on the west from the North American plate on the east). On the Peninsula, the topography east of the San Andreas fault consists

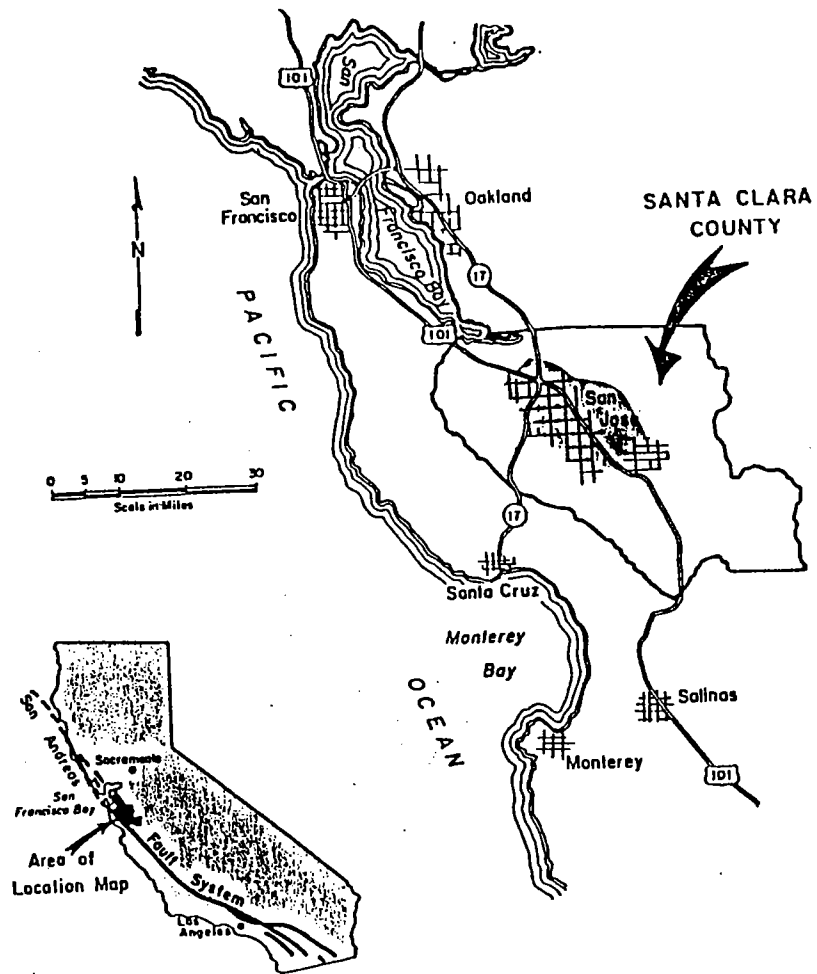


Figure 1. Location map for the San Jose area within the greater San Francisco Bay Region of central California. Note the lengthy shoreline (San Francisco Bay and Pacific Ocean) in this region.

