



*Philip C Rutledge*

## Philip C. Rutledge

1906–1990

By James P. Gould

Philip C. Rutledge, consulting engineer and teacher, died on July 14, 1990, at the age of eighty-four. Elected to the National Academy of Engineering in 1968, Dr. Rutledge was a pioneer and leader in geotechnical engineering since its early development in the United States in the 1930s. His consulting was marked by the systematic application of fundamental soil mechanics to many of the most important earthwork and foundation projects of his time.

A graduate of Harvard College in 1927, Rutledge received an M.S. in civil engineering from the Massachusetts Institute of Technology (MIT) in 1933 and D.Sc. from Harvard in 1939. In 1957 he was awarded an honorary doctor of engineering degree from Purdue. His career spanned fifty years between graduation in 1927 and retirement from consulting practice in 1977. This time was divided into two periods: he spent the first twenty-five years as a teacher and specialized consultant to industry and the federal government, the last twenty-five as a partner of Mueser Rutledge Consulting Engineers in New York City. In his early years, Rutledge worked with the leaders of the new soil mechanics at MIT until 1933 and at Harvard from 1933 to 1937. With Arthur Casagrande he organized the first International Conference on Soil Mechanics and Foundation Engineering, which was held in Cambridge in 1937.

As a professor from 1937 to 1943 at Purdue University and

from 1943 to 1952 at Northwestern University Technological Institute, he was instrumental in establishing geotechnical studies in their civil engineering departments. At Northwestern he collaborated with Jorj O. Osterberg to design and build an impressive array of laboratory testing equipment, which gave Northwestern one of the strongest soil mechanics programs in the country. He moved from the position of department chairman at Northwestern to a consulting practice at Mueser Rutledge in 1952.

While teaching, he served the U.S. Army Corps of Engineers as consultant on airfield pavements and as chairman of their panel on soil mechanics research and development, receiving in 1949 the War Department's Certificate of Appreciation for services in developing airfield pavements for heavy aircraft. One of his most important contributions was a 1947 review of the Waterways Experiment Station research program on shear strength of clay, research that had been performed by Casagrande at Harvard and Donald Taylor at MIT.

Rutledge's contacts while at Northwestern University with the then Moran Proctor Freeman and Mueser firm led to his acceptance of an offer to join the firm in 1952. During the next twenty-five years his consulting activities expanded to include many of the largest heavy-construction projects of the day. In collaboration with his partners, who were foundation engineers of vast experience, Rutledge contributed the insights and logic of modern soil mechanics. His specialties included earth dams, tunnels, building foundations, waterfront structures, and underground construction.

For twelve years, from 1962 to 1974, he was chairman of the Board of Consultants for earth and rockfill dams of the California Department of Water Resources. He participated in the completion of seven major dams. Five of these range upward from 300 feet in maximum height to the 770-foot-high Oroville Dam. Pumped storage hydroelectric developments were another specialty, comprising seven major projects including the Blenheim-Gilboa facility of the State of New York Power Authority.

Because of his extraordinary ability to adapt basic geotechni

cal engineering to practical construction problems, he was much sought after as a consultant on projects of grand scale. Rutledge participated in advisory boards for the Plowshare project of the U.S. Atomic Energy Commission, Salinity Control Barriers in San Francisco Bay, foundations for atomic accelerators of Lawrence Radiation Laboratory, and the Atlantic-Pacific Interoceanic Sea Level Canal Study of the Corps of Engineers.

Some of his most effective work was done in a classic collaboration with his partner William H. Mueser. Mueser was the hard-driving doer, Rutledge the quiet analyst never committing until he had thought through the problem. Together they forged the basic foundation concepts for the Savannah River atomic plant, Texas Tower radar platforms, the Washington subway, the Vertical Assembly Building at Cape Kennedy, and a series of new buildings for the expanded congressional facilities in Washington, D.C.

Throughout his career, he was active in the American Society of Civil Engineers, serving as president of the New York Metropolitan Section in 1955, national director from 1958 to 1960, and member and chairman of the Executive Committee of the Geotechnical Engineering Division from 1947 to 1952. He was the 1969 Terzaghi Lecturer and recipient of the Terzaghi Award.

To his many students during the first twenty-five years of his career, Rutledge was an extraordinarily well-organized, concise, and sympathetic teacher, presenting rapidly evolving ideas in soil mechanics, a field in which he had contributed significantly. His particular research interests included the relationship of shear strength of clays to their preconsolidation stress, stability of foundations under lateral load, mechanics of load transfer in foundation piles, and the assessment of sample disturbance in consolidation testing.

To his partners and colleagues at Mueser Rutledge Consulting Engineers, he was the final authority on geotechnical matters. If no answer was forthcoming from the literature or from the firm's experience, Rutledge would make his own concise analysis and recommendation. Nothing pleased him more than an opportunity to solve a difficult foundation problem by work

ing up from first principles of mechanics. Although he was entirely separated from academia in the latter half of his career, he functioned as teacher and preceptor for his colleagues. Whatever the accomplishments of his successors, their best work will bear the imprint of Philip C. Rutledge.

