

Ralph B. Peck (1912-2008)

By Jim DeStefano, P.E., AIA

Ralph Peck was a pioneer in the development of Soil Mechanics and Foundation Engineering. To many structural engineers, he is just a name on a well worn old textbook. However, to those who had the privilege to have worked alongside him, or to have studied under him he was an unforgettable individual. Despite his many accomplishments, he remained a very modest and grounded person.

He never set out to be a pioneer or even a soils engineer. It is just something that happened. As a young engineer, Ralph Peck happened to be in the right place at the right time and found himself at the cutting edge (or maybe the digging edge) of soil mechanics. Perhaps it was just by chance or maybe it was his destiny.

Born the son of a bridge engineer, Ralph spent his childhood living in various parts of the western United States and Canada – wherever railroads were being built. He dreamed of being a bridge engineer like his father. Upon graduating from high school, his father landed him a job working on the railroad signal gang of the Denver and Rio Grande Railroad. It was hard physical work and not particularly glamorous, but it did give him a hands-on appreciation of soils and construction.

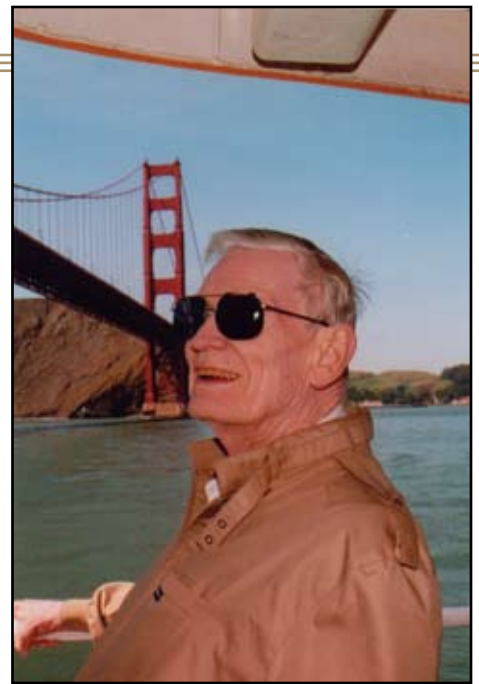
In 1930, Ralph Peck enrolled at Rensselaer Polytechnic Institute (RPI), a university famous for its bridge engineering program. He was an exemplary student. While his civil

engineering coursework concentrated on structural engineering, he took a keen interest in also studying geology. After receiving his undergraduate degree, Ralph Peck continued on at RPI and obtained a doctorate degree.

Upon graduating from RPI in 1937, Ralph Peck took a position with the American Bridge Company as a structural steel detailer. But his career as a bridge engineer was destined to be a short one. After just a few months, he was laid off. The economy was still in the grip of the great depression and work was scarce.

His job search led him to a position at Harvard University as an assistant to Professor Arthur Casagrande, who was teaching a course in the new field of soil mechanics. Ralph Peck caught on quickly to soil mechanics, attending Casagrande's lectures and serving as a teaching assistant. Most of his time was spent working in the soils laboratory on Arthur Casagrande's consulting projects.

Karl Terzaghi joined the faculty at Harvard after escaping from Nazi controlled Austria. Terzaghi was internationally known as the "father of soil mechanics." He was working on the manuscript for a textbook, but was having difficulty translating some of the technical terminology into English. Ralph Peck was selected to assist Terzaghi with the translation and after a brief meeting the two men hit it off together. It would be the beginning of a lifelong collaboration.



Terzaghi was invited to visit Chicago, where the city was in the midst of building a new subway system. He gave a lecture on the dangers of tunneling through soft clay in urban areas. His lecture got a lot of attention, since the Chicago subway project was experiencing problems with building settlement and subsidence of roadways. The city engaged Terzaghi to supervise the subway construction and set up a program for soil testing. He needed an individual on site to spearhead the project and Ralph Peck was the natural choice.

Working on the Chicago subway project was an extraordinary opportunity for Peck. Systematic soil sampling and testing was performed of Chicago's clays. Measurements were taken of soil movements within the tunnel excavations, as well as the deformation of excavation bracing and shoring. Peck was able to correlate soil movements within the tunnel excavations with measured settlements of the buildings above. He helped develop and implement improved techniques for temporary bracing of the subway tunnels. Soon problems with settling buildings subsided. Some credited Ralph Peck with saving the city of Chicago from destruction.

When World War II broke out, construction on the subway project wound down. As American industry geared up for military production, many new opportunities presented themselves for Ralph Peck and Karl Terzaghi to collaborate on consulting projects, including the Republic Steel mill in Cleveland and the Newport News shipbuilding dry dock in Virginia. The two men had become a very effective team.



Trans-Atlantic Oil Pipeline, Alaska. Courtesy of USGS.

In 1942, Ralph Peck accepted a position as a professor at the University of Illinois, Champaign-Urbana. It was a position that he would hold for over 30 years. He lectured on soil mechanics and foundation engineering to the structural engineering students. Karl Terzaghi soon became a frequent guest lecturer at the University of Illinois.

Terzaghi was still having difficulty with the manuscript for his textbook, so he asked Ralph Peck to co-author the book with him and help him to put it into readable English. They labored on the manuscript together for six years. The final product, *Soil Mechanics in Engineering Practice*, is without a doubt the most comprehensive book on the subject and is still in use today.

Some years later, Ralph Peck co-authored another textbook, *Foundation Engineering*, along with Walter Hanson and Thomas Thornburn. The book was based on the class notes from his Foundation Engineering course at the university. The extraordinary thing about *Foundation Engineering* was the way in which it merged the soil mechanic aspects of foundation design with the structural engineering considerations. This book would also soon become a classic.

At the University of Illinois, Ralph Peck trained several generations of engineers. He hand picked the faculty and built a world class program in soil mechanics. His lectures emphasized the importance of common sense and field observation. Students were encouraged to get their hands dirty in the field and not to rely too heavily on theoretical analysis techniques. He believed that a solid background in geology was essential to understanding soil formations and behavior. The study of geology is conspicuously

absent from most geotechnical engineering curriculums. He also believed that structural engineers should have a solid background in soils and foundations. Regrettably, the structural engineering profession has drifted away from becoming involved in foundation design and tends to rely too heavily on geotechnical consultants.

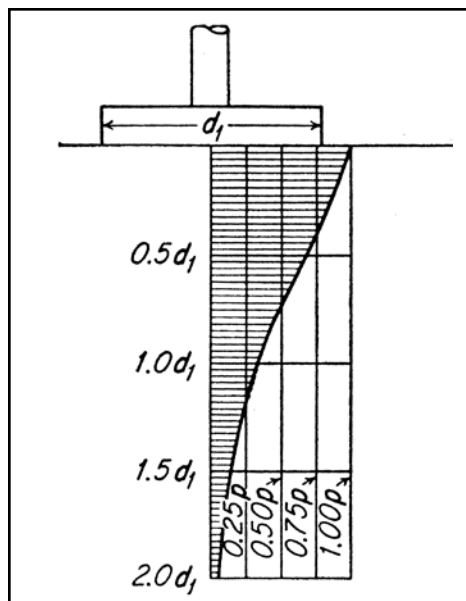
The course that had the most profound impact on Peck's students was his Case Study course. Rather than lecture to the class, he would treat the students as a board of consultants. Real world foundation problems would be presented and the class would have to crack the case. The students would perform an investigation and collect subsurface data to help them unravel the mystery. Each student would have to write a report that described the cause of the problem and a solution. The report had to be typewritten on one sheet of 8½ x 11-inch paper. Ralph Peck was often quoted saying, "If you can't reduce a difficult engineering problem to just one page, you will probably never understand it."

In 1974, Ralph Peck retired from his full time position at the University of Illinois and moved to Albuquerque, New Mexico. He remained a Professor Emeritus at the university, and over the next 30 years he returned to Illinois twice a year to give a series of lectures and to stay in touch with the students and faculty.

Throughout his career, Ralph Peck served as a consultant on countless foundation and dam projects. He collaborated on projects with Karl Terzaghi up until Terzaghi's death in 1963. Some of Peck's more notable projects include the rapid transit systems in the San Francisco Bay area and the Washington D.C. metro area, the Alaska oil pipeline, the James Bay project in Canada, and the bridge across the Gulf of Corinth in Greece.

President Gerald Ford presented Ralph Peck with the 1974 National Medal of Science "for his development of the science and art of subsurface engineering, combining the sciences of geology and soil mechanics with the practical art of foundation design."

If Karl Terzaghi was the father of soil mechanics, it could be said that Ralph Peck was its uncle. But despite all of his technical accomplishments, the thing that his colleagues remember most is what a terrific person and nice guy Ralph Peck was. He was never heard saying a disparaging remark about anybody, and he was always willing to help out a fellow engineer. ■



Pressure distribution in soil.

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