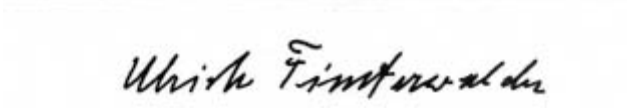

Ulrich Finsterwalder

1897-1988

By Anton Tedesko

This uniquely gifted, internationally renowned structural engineer was born in Munich, Germany, on December 25, 1897, and he died there on December 5, 1988.

Finsterwalder lived a full life, remaining active until the very end, which came after a brief illness. He was an enthusiastic skier in the Alps and continued when he was past ninety. The task of running his farm was another source of enjoyment.

Of the great structural engineers of this century, Ulrich Finsterwalder should perhaps be ranked among the top half-dozen. Among this group he was the most versatile. Finsterwalder was known for his creative construction ideas, and he had a decisive influence on the modern art of engineering and construction.

Finsterwalder was a designer-constructor, researcher, inventor, entrepreneur, and author. For many years he was the chief engineer and the driving force behind the works of Dyckerhoff & Widmann A. G. (Dywidag), the Munich-based design and construction firm well known for its pioneering of reinforced concrete. He eventually became a member of the firm's executive committee. In recent years he was an independent consultant.

Finsterwalder was a designer of numerous monumental and unique structures including buildings, highways, bridges, dams, shell-type concrete ships, vessels for the transport of

liquefied natural gas, floating harbors, and tunnels. The Dywidag thread bar, a device that has become standard on many construction jobs throughout the world, was one of his inventions.

He was among the leading innovators in prestressed concrete, and many of today's standards of that material are the result of his original ideas decades ago. Finsterwalder was a pioneer in free cantilever construction, which is now known as segmental construction; he originated the stress ribbon bridge and supervised the design and construction of one of the first cable-stayed bridges in concrete.

His father, Dr. Sebastian Finsterwalder, a Bavarian, was professor of mathematics at the Munich Institute of Technology and became the originator of the fundamental principles of modern photogrammetry. His mother was a member of a well-known family from the mountains of South Tyrol, which was then a part of Austria.

As a teenager, Ulrich Finsterwalder served in World War I. Captured by French troops, he spent two years in a prison camp, a time he used to study mathematics, which became the foundation for his later scientific efforts and his life as an engineer.

The following story is illustrative of his personality: The ancestral family house stood in the southern part of the Tyrol mountains. After the war this part of the Austrian province became a permanent part of Italy; the change was strongly resented by the population of South Tyrol. In addition, the Finsterwalder family objected to fortifications and antiaircraft batteries installed by the military very close to the family home. Ulrich Finsterwalder decided that the house should be moved. He organized his brothers and with them he patiently numbered every beam and board and carefully took the chalet-type house apart, piece by piece. With his brothers he trucked the material one hundred miles to North Tyrol where they reassembled the house at the foot of mountains that are quite similar to those where the house had previously stood. Today the old family home stands in Going, Austria.

Ulrich attended the Munich Institute of Technology and graduated with a doctorate in engineering, based on a thesis of his bending theory of cylindrical shells. He excelled in statics and dynamics and had an uncanny judgment as to stresses and flow of forces. He was most productive in coming up with new systems in design and construction technologies. His love of engineering was reflected in his inspired contributions. Always present in his mind was this question: "How can it best be built?"

Dr. Finsterwalder demanded as much of himself as he did of others; at the same time, he was personally modest and pleasant to work with. Coworkers and those who worked under him considered it a privilege to be involved in his efforts, were constantly astonished by how prolific he was, and marvelled at his inventiveness, stamina, and tenacity. He was a great teacher, judging the work of others fairly. He spoke out against low-quality work and wasteful and poorly conceived solutions.

He has left behind his imprint on millions of square feet of long-span concrete shell structures as well as hundreds of bridges in many nations. His first major shell structures, the Great Market Halls of Frankfurt, Budapest, and Cologne, were built in the 1930s. Long-span airplane hangars followed. His first major prestressed concrete spans over the Rhine River at Worms were built in 1953. Bridges in central and southern Europe followed. One of his favorite designs was the spectacular Mangfall Bridge that, like the Brooklyn Bridge, was designed so that pedestrians can walk through the structure. His Bendorf Bridge (1964) over the Rhine River, a 4,000-foot prestressed concrete crossing with a main span of 682 feet, served as the textbook for later structures of this kind. The span was a record at that time but soon thereafter was exceeded by the 754-foot Urado Bridge in Japan.

In Japan alone, there were more than one hundred bridges built prior to 1973 that were based on Finsterwalder's designs and construction techniques. His lectures in the United States in the mid-1960s led to numerous other such structures in California, Hawaii, and Canada.

In recent years he was involved in numerous studies of major bridges and tunnel projects, including proposals for crossings of the British Channel, the Bosporus, and the Strait of Messina. He was pleased when at age ninety he was appointed to the multigovernment planning board for the proposed Brenner crossing of the Alps. Also in 1988 in a joint venture with a New York City firm, he participated in a proposal for a new 1,600-foot suspension span to replace the Williamsburg Bridge in New York. Dr. Finsterwalder was also a consultant in the early planning for Florida's Dame Point Bridge, a cable-stayed span that established the U.S. record at 1,300 feet.

Ulrich Finsterwalder's honors and awards were many, and they came from governments, engineering groups, and educational institutions throughout the world. His first American award, the Longstreth Medal of the Franklin Institute of The Commonwealth of Pennsylvania, came even before World War II. In addition to honorary membership in the American Concrete Institute, he was accorded the Institute's Charles S. Whitney Medal in 1967 for "distinguished contributions to the engineering development of concrete shells and prestressed bridges."

He was the first bridge engineer to receive the International Award of Merit from the International Association for Bridge and Structural Engineering (1977) and was also the first non-American structural engineer to be elected a foreign associate of the National Academy of Engineering of the United States (1976).

Other honors included the Inventor's Prize of Honor of the German Federal Republic, the Great Cross of Merit also of Germany, the Fritz Schumacher Prize of the Senate of the City of Hamburg, the Emil Morsch Medal of the German Concrete Association, and the honorary membership in the British Concrete Society. He was elected an extraordinary member of the Academy of Fine Arts in Berlin and received honorary doctorates of the universities at Munich and Darmstadt, the Carl Friedrich Gauss Medal, the Gustave

Magnel Gold Medal of Belgium, and the Freyssinet Medal of the International Federation for Prestressing. He held nearly twenty patents on his inventions and authored more than eighty technical papers including some on specialized subjects, for example, self-stressing trusses or a slipform-constructed, suspended floating underwater bridge (a tunnel).

His love and devotion to his family were outstanding. In the days that followed World War II, food shortages were not uncommon in devastated Germany, and the Finsterwalder family was not alone in their needs. As a result, Ulrich made frequent nightly trips on foot across the mountains into Austria in order to bring back food for his family.

Such crossings were forbidden and violators were threatened with the death penalty. On one occasion Ulrich was arrested by a border patrol guard, but speaking to the man as a priest would have talked, he convinced the guard that the moral law of a father and a husband was stronger than the rules of military occupation authorities. The guard let Finsterwalder escape.

Those postwar days resulted in Finsterwalder's purchase of a cow, and this led to his interest in farming. A family-owned large dairy farm was the outcome of this, and Finsterwalder's ingenious mind was in evidence even in this endeavor; for example, the cow barn was a concrete shell.

His family included his wife, Eva; three sons, Klemens, Lorenz, and Thomas; two daughters, Ruth and Renate; and twelve grandchildren. Three of the children have doctorate degrees in engineering or science. Thomas, the youngest, also a Munich engineer, holds the world record in hang-gliding. The Finsterwalder name is known not only for imaginative bridges designed by the father but also for the hang-gliders researched, designed, and built by his son Thomas.

When death came in a Munich hospital, he was surrounded by his family. His last words to them were "Love is the most important foundation of our existence."