150 Years of DYWIDAG-SYSTEMS INTERNATIONAL

by Dave Martin, DYWIDAG-Systems International USA Inc.

Bruecke-aus-Stampfbeton made of high-compression concrete.

DYWIDAG is celebrating a special anniversary: 150 years. At this time, we are looking back at the beginnings of modern industrial construction and reflecting on the extraordinary achievements of DYWIDAG engineers. These achievements continue to motivate us to develop creative and technically innovative solutions for construction. Now, in the twenty-first century, more and more daring architectural designs are possible, and we know that this creative power would have been unthinkable had it not been for the development of new concrete construction methods, from precast concrete to post-tensioning.

It is difficult to appreciate today how much technical knowledge and risk-taking was needed to begin using unreinforced concrete. This original concrete was compacted by pressure surges during pounding (compressed concrete) in structures for which safety had to be of the utmost importance.

1880—12-m (39 ft) Span in Dusseldorf

One of the first concrete bridges in Germany using this technology was built by DYWIDAG in 1880. It was an exhibition bridge with a 12-m (39 ft) span that carried a pavilion and stood on the premises of Dusseldorf's trade and art exhibition. The demolition of the bridge at a later stage was extremely difficult due to the high compression of the concrete. For a quarter century thereafter, DYWIDAG built compressed concrete bridges.

In 1922, DYWIDAG built a unique, 60-mm-thick (2.4 in.), 25-m-diameter (82 ft) dome structure. Still today, the construction material concrete is constantly proving its superiority around the world for shell construction and in post-tensioning. Both construction methods are inseparably connected with the name of Dyckerhoff & Widmann AG (DYWIDAG).

1927—Saale Bridge Alsleben

In 1927, DYWIDAG was awarded the contract for construction of the Saale Bridge Alsleben, having designed an innovative dual pivot arch rib structure with stress ribbons. During construction, the stress ribbons were first connected with one side of the 68-m-long (223 ft) arches and loosely positioned above a recess in the middle of the longitudinal girders for the bridge deck. Afterwards, the stress ribbons were tensioned using a newly developed puller until they had reached their working load and were then concreted. This project represented the first important step towards post-tensioned concrete.

The post-tensioning construction method developed by DYWIDAG introduced an innovative period for the construction industry. Thanks to this method, it may be said that concrete triumphed over the laws of gravity and it was used in new areas for the first time. Even major bridges could be built using post-tensioning and concrete instead of the steel construction method.

1965—Pioneer Work and a World Record

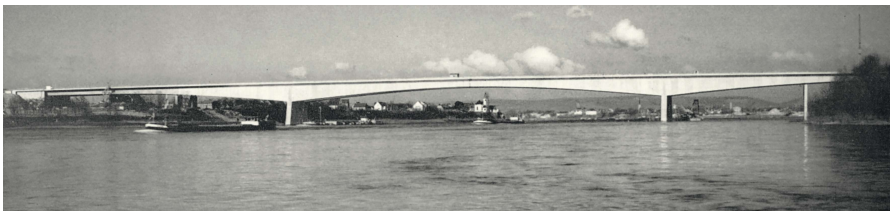
A convincing example for this development is the Bendorf Bridge, which crosses the Rhine north of Koblenz, Germany. With a span of 208 m (682 ft), it was the world's widest concrete girder bridge when opened in 1965. Even today, it is still fully functional.

Know-How for International Projects

In the 1950s, in addition to its traditional business area of construction, DYWIDAG began signing license and consulting contracts for the application of the different DYWIDAG construction methods around the world. The success in post-tensioning was especially helpful for DYWIDAG in this process. This mainly applied to the following areas:

- Bridges built using the DYWIDAG Post-Tensioning System
- Construction of large bridges using the patented DYWIDAG Free Cantilever Method
- DYWIDAG Prestressed Concrete Sleepers (Crossties)

In Europe, the DYWIDAG Post-Tensioning System was mainly used in conjunction with the free cantilever method and the use of precast concrete elements. The first projects were the Freudenau Harbor Bridge and the Au-Leistenau Bridge in Austria. In Sweden, a large number of bridges were built using the free cantilever and precast concrete methods. Examples include the bridge leading over the Kallosund near Skagerrak with a main span of 94 m (308 ft), which was completed in 1957. Additional license agreements were signed in Denmark, Finland, Norway, and the Netherlands.



Bendorf Bridge near Koblenz, Germany, was the world's widest concrete girder bridge when it opened in 1965.

Kap Shui Mun Bridge in Hong Kong, China, is an example of DSI Cable-Stay Technology.

Abraham Lincoln Bridge, Louisville, Ky. is an example of a DSI International Partnership.

Beginnings of DYWIDAG-Systems International

The license and consulting business was a completely new business idea for a conventional construction company. DYWIDAG had already begun to successively sign license and consulting contracts for the application of the DYWIDAG construction methods in many countries in the 1950s. The continuous extension of the license business formed a successful part of DYWIDAG's international business.

The positive results in the license business also caused DYWIDAG to venture into the United States and Canada. Consequently, DYWIDAG Inc. was founded in the USA in 1969, and a representative office was also opened in Canada.

In the following years, the geotechnical product range was increasingly expanded, and at the same time, the Strand and Bar Post-Tensioning System portfolio was continuously widened in accordance with the dynamic market development. Sales were carried out both via the international network of licensees and via affiliated companies. The DYWIDAG THREADBAR™ was revolutionary for civil applications, and DYWIDAG's research and development department worked on the development of additional high-quality geotechnical systems at full speed.

1979—Foundation of DYWIDAG-Systems International

Thus, the DYWIDAG license department became the independent company DYWIDAG-Systems International (DSI) in 1979. The new DSI changed very quickly and increasingly acted as a global company. At the beginning of 1979, DSI already had more than 450 employees.

DSI continuously strengthened its international business, and the products and systems were further adapted and optimized to suit the requirements and needs of local markets. The two pillar model consisting of DYWIDAG Post-Tensioning Systems and DYWIDAG Geotechnical Systems was continuously developed over the course of time, and the know-how in post-tensioning was used to develop additional systems with different anchorage types for cable-stayed bridges. A unique example for this special know-how was the construction of the Kap Shui Mun Bridge in Hong Kong, China, in 1995.

2000—Market Entry into Mining

In September 2000, the company entered the specialized ground support market through acquisitions in Australia and later plants were established in South Africa and North America in 2002.

2016—Today

The DSI network is stronger than ever and our success is based on a clear strategy. In construction, we are successful in the business segments of Post-Tensioning, Geotechnics, and Structural Repair and Strengthening. In underground, we are active in the business segments Mining and Tunneling. Today, approximately 2300 dedicated employees around the world work for the DSI Group.

We uphold the awareness and the values derived from our 150-year-long history—this is what we stand for—each and every one of our experienced and dedicated staff members. We are continuously developing new and innovative systems for exciting and challenging construction projects around the globe and continue to operate with a **Local Presence and Global Competence**.

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