

Eugene C. Figg, Jr.

Eminent Designer of Signature Bridges

By Richard G. Weingardt, P.E.

Internationally acclaimed as an extraordinary bridge engineer, Eugene Cecil “Gene” Figg, Jr. was the designer of numerous famous and award-winning bridges around the world – in 30-plus states in the U.S. and several foreign countries. He boldly instigated, advanced and pioneered countless innovative engineering and construction techniques, including complex precast concrete segmental and cable-stayed bridge designs, to create record-setting masterpieces such as the Sunshine Skyway Bridge across Tampa Bay, Florida; Natchez Trace Parkway Arches near Nashville, Tennessee; and Hanging Lake Viaduct in Glenwood Canyon, Colorado.

Under his leadership and innovative guidance, Figg’s firm built a stellar international reputation for leading-edge bridge designs that are environmentally sensible and cost-effective, both at construction and during operation. Figg-designed structures evoke a sense of civic pride. Said Figg, “We are designing bridges for 100 years or more. People will see this bridge for a long time, so it needs to be the best you can design. It needs to be a piece of art.”

His dedication toward accomplishing this and in producing structural art was instrumental in Figg’s firm receiving hundreds of design recognitions, including the distinguished Presidential Design Awards through the National Endowment for the Arts. In its history, the Presidential Award Program has recognized only five bridges, three of them designed by Figg Engineering Group:

- Blue Ridge Parkway Viaduct around Grandfather Mountain in North Carolina in 1984.
- I-275 Bob Graham Sunshine Skyway Bridge in Florida in 1988.
- Natchez Trace Parkway Arches in Tennessee in 1995

The Natchez Trace Parkway Arches, with a 582-foot main span, is the longest precast concrete arch bridge in the U.S. During Figg’s 40-year career, a dozen of his bridges appeared on the cover of *Engineering News-Record* (ENR).

Often referred to as the “man who loves bridges,” the personable and outspoken Figg was also the recipient of many individual honors. In 2000, he received the prestigious John A. Roebling Medal for “lifetime achievement in bridge engineering” at the

International Bridge Conference in Pittsburgh, Pennsylvania. Upon receiving the award, Figg said, “I appreciate the recognition of this great honor and look forward to many, many more years of creating bridges as art.”

He was inducted into the National Academy of Engineering in 2001 and was presented, posthumously, with the American Society of Civil Engineers’ OPAL Award in 2002, for his lifetime of producing outstanding bridge designs.

A native of Charleston, South Carolina, Gene was born on August 4, 1936, the only son of Eugene and Marcia (Molony) Figg. The couple also had one daughter, Marcia Ann. As a youngster, Gene loved collecting stamps, spending time at the beach and engaging in sports. He also had a passion for building scale models of all sorts, mainly ships and airplanes – possibly influenced by his father, a civil engineer, whose career was spent as the highest-ranking civilian at the U.S. Naval Shipyard in Charleston.

According to *Wikipedia*, “He [young Figg] was only allowed to work on his models on rainy days, as his mother apparently had a rule that required him to be outside whenever the weather was nice.” Gene’s mother always told him and his sister, “From those to whom much is given, much is required.” To



Figg at the job site of the 18,425-foot long Garcon Point Bridge near Pensacola, Florida.



Eugene “Gene” Figg, Jr.

earn spending money, Gene had two paper routes and sold peanuts for five cents a bag at baseball games.

Later in high school, he was on the Charleston High School football team where, at 5 feet 11 inches and 180 pounds, he played center. A dedicated student, Gene decided to become a civil engineer like his father and attended the Citadel, where he graduated in 1958 and where his father had graduated in 1928. Figg liked to recall that he learned engineering from the ground up, since the summer before he entered the Citadel he worked in construction digging ditches for foundations.

His university days as a cadet impressed him greatly. Said Figg, “It was the Citadel system, more than anything else, which equipped me to compete in the business world. At the Citadel, I learned the value of time plus leadership and discipline.”

On June 7, 1958, in Charleston, Figg married his high school sweetheart Ann Ruth West. Both came from South Carolina families, grew up in Charleston and held many of the same traditions and values.

The Figgs raised four daughters – Linda, Karen, Donna and Nancy. Linda, the oldest, “loved math, science and creating” as a youngster and followed in her father’s footsteps by becoming a structural engineer, a 1981 graduate of Auburn University. After working with her father at his bridge engineering company for 20 years, she became President/CEO of the firm when he passed away. Karen graduated in architecture, also from Auburn University; Donna graduated from Florida State University’s College of Business in hospitality management, and Nancy, after graduating from Auburn University, received her law degree from Catholic University.

In 1958, after receiving his civil engineering degree, Figg went to work for the Florida Department of Transportation (FDOT).



Blue Ridge Parkway Viaduct around Grandfather Mountain, North Carolina, 1984. It completed the last stretch of the spectacular Blue Ridge Parkway for the National Park Service and Federal Highway Administration.

There, he met an important engineering mentor and role model – William “Bill” Dean (1911-1965), a Florida native and University of Florida graduate. Dean had been working for FDOT since 1932, and from 1948 until 1962 was its chief bridge engineer.

In 1964, Figg left FDOT to become the structural engineering partner in the Tallahassee-based architectural/engineering firm of Barrett, Daffin and Figg. The firm designed a variety of structures, including high-rises, parking garages and bridges.

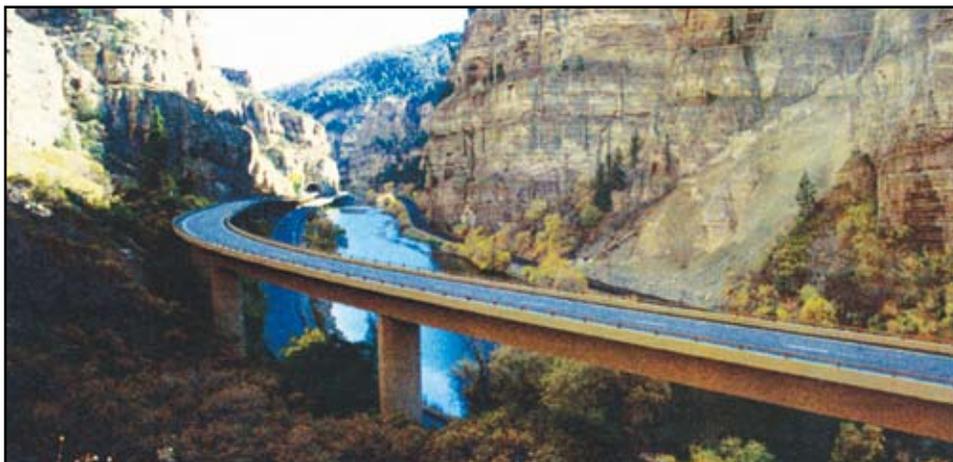
In 1978, Figg, with Paris-based partner Jean Muller (1925-2005), formed Figg and Muller Engineers (F&ME), located in Tallahassee. Eleven years Figg’s senior, Muller was similarly trained by one of his country’s leading advocates of prestressed and precast concrete construction – Eugene Freyssinet (1879-1962).

Figg and Muller decided to develop the precast concrete segmental technology in the

U.S., and its founders personally supervised the designs of several innovative bridges utilizing the system. When F&ME coupled this construction method with cable-stayed supports, they increased the effective use of high-strength concrete in long-span bridges and helped change the way bridges were built in North America.

The first bridge designs produced by Figg and Muller were in the Florida Keys and included the Long Key Bridge and Seven-Mile Bridge. Several innovative design features introduced in the Long Key Bridge simplified the construction procedures that had been utilized in segmental structures of previous generations, and many of Long Key’s innovations continue to be utilized in segmental bridges today.

The Seven-Mile Bridge, whose design was similar to Long Key’s, had its superstructure segments prefabricated in Tampa, Florida, and shipped by barge to the bridge site due to the limited material availability and the difficult



Hanging Lake Viaduct in Glenwood Canyon, Colorado Rocky Mountains. Opened in 1992, it was threaded through the pristine canyon while protecting its surroundings.

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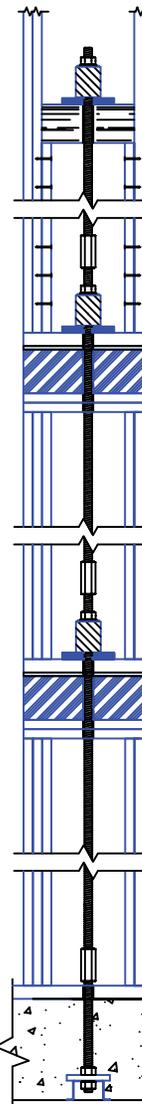
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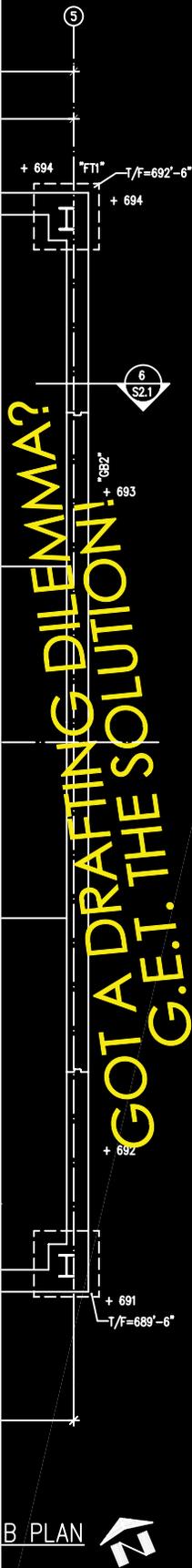
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Natchez Trace Parkway Arches near Nashville, Tennessee, 1995. The 582-foot main span make it the longest precast concrete arch bridge in the U.S.

access in the Florida Keys. When completed in 1982, Seven-Mile Bridge was the longest continuous precast concrete segmental bridge in the world.

Other notable Figg projects completed during this era included the MARTA Viaduct in Atlanta, Georgia, the first application of precast-concrete segmental construction for a rail mass-transit project. Next came the Blue Ridge Parkway Viaduct around North Carolina's Grandfather Mountain. It was a complex structure with tight curves whose alignment followed a steeply sloped mountainside, with boulders and trees that required protection.

The Hanging Lake Viaduct in Glenwood Canyon in the rugged Rocky Mountains of Colorado – the last part of the nation's I-70 highway system – similarly was designed and built with minimal impact on the environment. Its construction utilized a balanced cantilever concept and a self-launching gantry.

Noteworthy precast concrete segmental cable-stayed bridge designs included the James River Bridge in Virginia, the C&D Canal Bridge in Delaware, and the Neches River Bridge in Texas. The firm's first cable-stayed masterpiece was its Sunshine Skyway Bridge across Tampa Bay. It was the longest concrete cable-stayed bridge in North America, with a 1,200-foot main span, when completed in 1987.

In 1988, Figg reorganized his engineering company, renaming it Figg Engineering Group, the name it carries today. The firm became renowned for designing precast, segmental concrete structures that are aesthetically pleasing, cost-effective and easily maintained. Included in the company's extensive portfolio of significant bridges designed while Figg was alive were the Leonard P. Zakim Bunker Hill Bridge in Boston, the Wiscasset and Sagadahoc Bridges

in Maine, the 19,265-foot-long Mid-Bay Bridge in Florida and the I-280 Veterans' Glass City Skyway in Ohio.

Well-recognized as an industry pacesetter, Figg held many leadership positions in several major engineering groups. He was the founder and past president of the American Segmental Bridge Institute, and served for four years as a trustee at the National Building Museum. He was president of the Florida Institute of Consulting Engineers and the Florida Engineering Society, and was active in the American Concrete Institute, National Society of Professional Engineers, Precast/Prestressed Concrete Institute and Post-Tensioning Institute.

Figg died March 20, 2002, at age 65 from fast developing leukemia.

By then, "the man who loved bridges" had been responsible for signature bridges in some thirty states and four foreign countries. His projects were the recipients of more than 150 national and international design awards and



Figg with daughter Linda at his induction to the National Academy of Engineering, 2001.



I-275 Bob Graham Sunshine Skyway Bridge, Tampa Bay, Florida. With a 1,200-foot main span, it was the longest concrete cable-stayed bridge in North America when completed in 1987.

were featured in numerous publications. Figg's impressive body of work over his forty-year career established him not only as a pioneer and leading advocate of segmental concrete and cable-stayed bridge design, but also as a daring engineer who followed his passion for creating structurally and aesthetically distinctive bridges. He said, "Our focus is to build bridges that are functional works of art."

In addition to his remarkable bridges, Figg's legacy included leaving an engineering company that follows – and has expanded on – his philosophy. It continues on today under the leadership of his daughter Linda, President and CEO, and longtime colleague Denney Pate, Senior Vice President and Principal Bridge Engineer of the company, along with many other engineers passionate about bridges.

Says Linda, "My father was an inspiration to me. He always said you can do anything you want if you put your mind to it. Anything is possible. It is a pleasure continuing his vision." According to Ann, Figg's widow, "Linda has not only continued her father's vision but has led the company to new and expanded visions, building on Gene's strong foundation."

Representative of Figg Engineering Group's current projects are: I-35W Anthony Falls Bridge in Minnesota, Penobscot Narrows Bridge and Observatory in Maine, Allegheny River Bridge in Pittsburgh, Fourth Street Bridge in Pueblo, Colorado, US 280 Elevated Roadway in Alabama, and US 191 over the Colorado River in Utah. ■

Richard G. Weingardt, P.E., is the CEO of Richard Weingardt Consultants, Inc. in Denver, Colorado. He is the author of nine books; the latest, Circles in the Sky: The Life and Times of George Ferris, is scheduled for publication by ASCE Press in late 2008. Weingardt's other recent book, Engineering Legends, features numerous great American structural engineers. He can be reached at rweingardt@aol.com.

All photographs are courtesy of Figg Engineering Group.



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