

SUNSHINE SKYWAY BRIDGE

The Bob Graham Sunshine Skyway Bridge, often referred to as the Sunshine Skyway Bridge or simply the Skyway, is a cable-stayed bridge spanning the Lower Tampa Bay connecting St. Petersburg, Florida to Terra Ceia. The current Sunshine Skyway opened in 1987 and is the second bridge of that name on the site. It was designed by the Figg & Muller Engineering Group and built

by the American Bridge Company and is considered a symbol of Florida. The four-lane bridge carries Interstate 275 and U.S. Route 19, passing through Pinellas County, Hillsborough County, and Manatee County. It is a toll road, with a \$1.50 toll assessed on two-axle vehicles traveling in either direction and collected via cash or the state's SunPass system. The original bridge



opened in 1954 (68 years ago) and was the site of two major maritime disasters within a few months in

1980. In January 1980, the United States Coast Guard Cutter Blackthorn collided with the tanker Capricorn near the bridge, resulting in the sinking of the cutter and the loss of 23 crew members. In May 1980, the freighter MV Summit Venture collided with a bridge support during a sudden squall, resulting in the structural collapse of the southbound span and the deaths of 35 people when vehicles plunged into Tampa Bay. Within a few years, the damaged span was demolished, the surviving span was partially demolished and converted into a long fishing pier, and the current bridge was built.

HISTORY

In 1924, J.G. "Jim" Foley, a realtor, and his partner Charles R. Carter joined with James E. Bussey, an attorney, to create the Bee Line Ferry Company. The service started on March 7, 1927, and originally had two ferries: Fred D. Doty and the City of Wilmington (which was later renamed Pinellas). The ferry crossed from the end of Bay Vista Park in St. Petersburg and went to Piney Point on the other side of the bay.

BeA physiotherapist from St. Petersburg named Herman Simmonds proposed building a "high-level suspension bridge" in 1926. Sometime during 1927, Simmonds received congressional approval and a permit from the US War Department to build a bridge. However, efforts were put on hold due to the Great Depression.

The Florida State Legislature gave the Bee Line Ferry a franchise for 50 years to operate it in 1929. The ferry service continued to expand with the Fred D. Doty being replaced by another ferry called the Manatee in 1932. A fourth vessel, the Sarasota was bought and put into service in 1937. Ferries departed every 30 minutes between 7:30 am and 9 pm during the winter. In the summer, they departed every 45 minutes. The ferry company ceased operating when the US federal government confiscated the boats as they needed them for the World War II war effort in 1942.

CONSTRUCTION

After the Summit Venture disaster, the southbound span was used as a temporary fishing pier and the northbound span was converted back to carry one lane in either direction until the current bridge opened. Before the old bridge was demolished and hauled away in barges, MacIntire (the only survivor in the collapse) was the last person to drive over it. He was accompanied by his wife, and when they reached the top of the bridge, they dropped 35 white carnations into the water, one for each person who died in the disaster. Both the main spans of both the intact northbound bridge and the damaged southbound bridge were demolished in 1993 and the



approaches for both old spans were made into the Skyway Fishing Pier State Park. These approaches sit 1/2 mile (800 m) to the south and west of the current bridge. The approaches of the 1950s span were demolished in 2008.

Gov. Graham's idea for the design of the current bridge won out over other proposals, including a tunnel (deemed impractical due to Florida's high water table) and a simple reconstruction of the broken section of the old bridge that would not have improved shipping conditions. The new bridge's main span is 50% wider than the old bridge. The piers of the main span and the approaches for 1/4 mile (400 m) in either direction are surrounded by large concrete barriers, called "dolphins", that can protect the bridge piers from collisions by ships larger than the Summit Venture like tankers, container ships, and cruise ships.

In 1990 FDOT awarded the winning bid to Hardaway Company to demolish all steel and concrete sections of the older Sunshine Skyway Bridge. The scope of the project required that all underwater piles and piers, and surface roadway, girders, and beams be dismantled. Special care had to be taken in removing underwater bridge elements near the shipping channel. Additionally, the concrete material, deck sections, pilings and steel girders were to be collected in order to be placed offshore and along the remaining bridge approaches to become artificial reefs for the new planned state fishing park. The main bridge span had to be removed in one piece in order not to block the main shipping canal leading to the Port of Tampa.

After extensive research, the engineering team developed a 4 × 1:16 ratio pulley system where each of the four corners of the span was connected to two 25-ton winches (bolted to the pavement of the deck). These winches controlled the descent of the main 360-foot (110 m), 608-ton span to a barge anchored 150 feet (46 m) below. As part of the project design, the engineering team developed a real-time, computerized, synchronized descent calculator and control program to help each of the two winch management teams ensure that all winches were synchronized at the same 30 feet (9.1 m) per minute descent rate. The operation was executed successfully in 2+1/2 hours despite adverse weather conditions.

In 2006, a feature film *Loren Cass* was released, which depicted a suicide jump off the Sunshine Skyway. Two years later, a second filmmaker, Sean Michael Davis of Rhino Productions, was inspired by his haunting experience witnessing a woman jump off the bridge so quickly that no one could intervene, to create a not-for-profit film titled *Skyway Down*. His objectives: to deter other potential jumpers by "'punch them in the face' with interviews with survivors and family members", to give them "hope and to try to de-glorify the romanticism of the bridge", in part by informing those who have "mulled a leap to know about the bloody, battered aftermath."

DESIGN

Strauss was the chief engineer in charge of the overall design and construction of the bridge project. However, because he had little understanding or experience with cablesuspension designs, responsibility for much of the engineering and architecture fell on other experts. Strauss's initial design proposal (two double cantilever spans linked by a central suspension segment) was unacceptable from a visual standpoint. The final graceful suspension design was conceived and championed by Leon Moisseiff, the engineer of the Manhattan Bridge in New York City.

Irving Morrow, a relatively unknown residential architect, designed the overall shape of the bridge towers, the lighting scheme, and Art Deco elements, such as the tower decorations, streetlights, railing, and walkways. The famous International Orange color was Morrow's personal selection, winning out over other possibilities, including the US Navy's suggestion that it be painted with black and yellow stripes to ensure visibility by passing ships.

Senior engineer Charles Alton Ellis, collaborating remotely with Moisseiff, was the principal engineer of the project. Moisseiff produced the basic structural design, introducing his "deflection theory" by which a thin, flexible roadway would flex in the wind, greatly reducing stress by transmitting forces via suspension cables to the bridge towers. Although the Golden Gate Bridge design has proved sound, a later Moisseiff design, the original Tacoma Narrows Bridge, collapsed in a strong windstorm soon after it was completed, because of an unexpected aeroelastic flutter. Ellis was also tasked with designing a "bridge within a bridge" in the southern abutment, to avoid the need to demolish Fort Point, a pre-Civil War masonry fortification viewed, even then, as worthy of historic preservation. He penned a graceful steel arch spanning the fort and carrying the roadway to the bridge's southern anchorage.

Ellis was a Greek scholar and mathematician who at one time was a University of Illinois professor of engineering despite having no engineering degree. He eventually earned a degree in civil engineering from the University of Illinois prior to designing the Golden Gate Bridge and spent the last twelve years of his career as a professor at Purdue University. He became an expert in structural design, writing the standard textbook of the time. Ellis did much of the technical and theoretical work that built the bridge, but he received none of the credit in his lifetime. In November 1931, Strauss fired Ellis and replaced him with a former subordinate, Clifford Paine, ostensibly for wasting too much money sending telegrams back and forth to Moisseiff. Ellis, obsessed with the project and unable to find work elsewhere during the Depression, continued working 70 hours per week on an unpaid basis, eventually turning in ten volumes of hand calculations.

With an eye toward self-promotion and posterity, Strauss downplayed the contributions of his collaborators who, despite receiving little recognition or compensation,[23] are largely responsible for the final form of the bridge. He succeeded in having himself credited as the person most responsible for the design and vision of the bridge. Only much later were the contributions of the others on the design team properly appreciated. In May 2007, the Golden Gate Bridge District issued a formal report on 70 years of stewardship of the famous bridge and decided to give Ellis major credit for the design of the bridge.