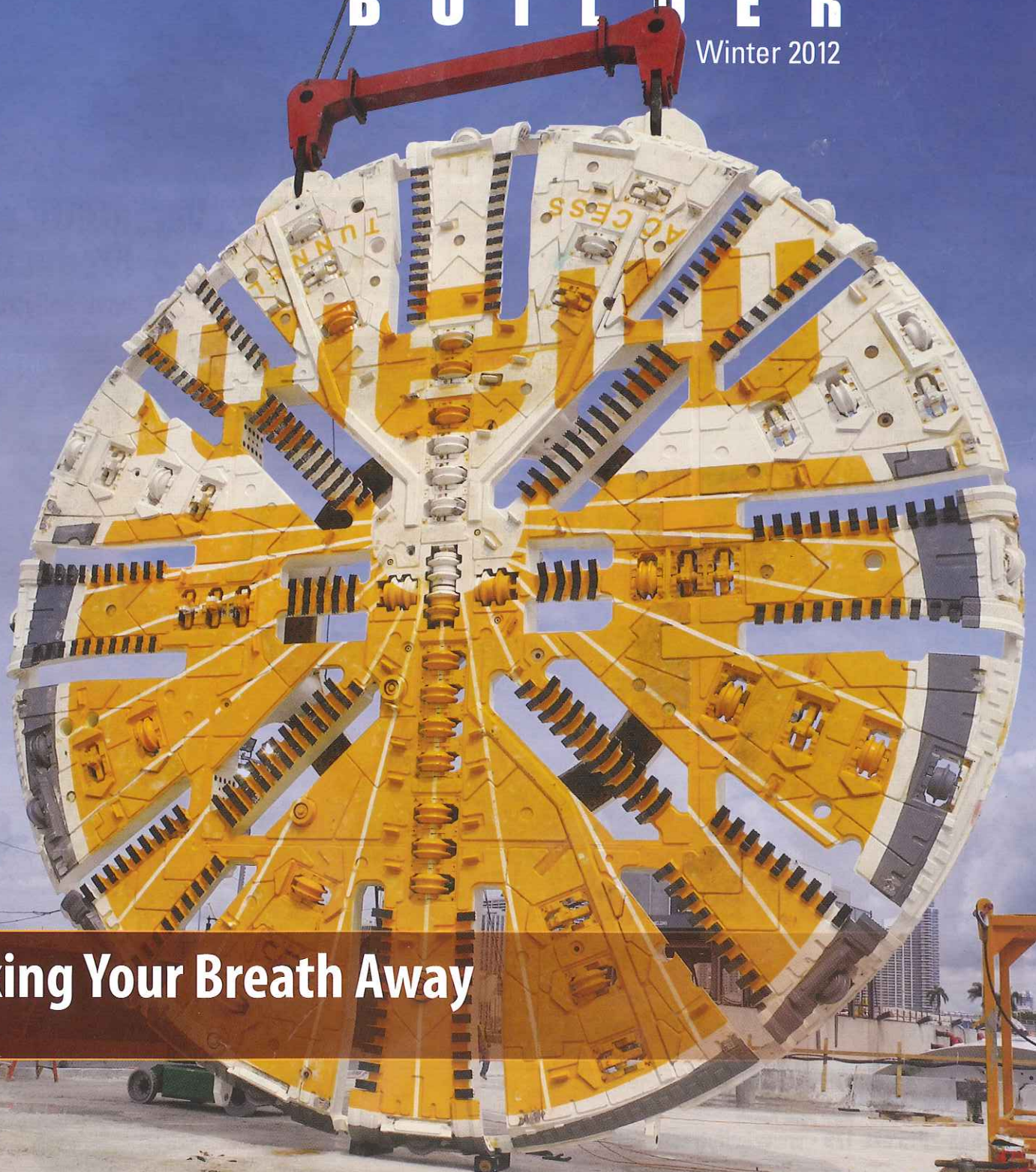


Florida Transportation

B U I L D E R

Winter 2012



Taking Your Breath Away

Page 6



Port of Miami Project Takes One's Breath Away in More Ways than One

Tunneling Process Underway on \$1 Billion Project

By Jerry Marks, TriAd

Floridians get ready to hold your breath.

In two years will you be up for the challenge? You know, that old-time family trip favorite – to inhale as you enter a tunnel and hold your breath until your vehicle exits into the light at the other end? If you aren't familiar with it, maybe you weren't asking your parents every 10 minutes of the trip, **“Are we there yet?”**

Well, by fall of 2014, the state's longest tunnel will be open in South Florida – the Port of Miami Tunnel. And at 3,900 feet long that means you'll have to hold your breath for approximately 48 to 59 seconds (depending on the speed limit) – and hope for no backups.

The Port of Miami Tunnel (POMT) project, which includes a bridge widening, tunnel and road construction and road realignments, commenced in May 2010. When the nearly \$1 billion project is completed, the Port of Miami will have direct access to interstates 395 and 95, as well as improved access to the world's largest port for cruise travel and one of the nation's busiest container ports. Currently, the Port of Miami is among the 15 busiest container ports in the U.S. and in 2009-2010 handled 4.15-million cruise passengers.

While more than a decade in the planning stages, when completed, the Port of Miami project will provide much-needed help in handling truck and tourist traffic through downtown and Biscayne Bay. According to a 2009 traffic study, each day nearly 16,000 vehicles – including nearly 4,500

trucks (28 percent) make their way to and from the Port of Miami.

The goal of the construction project is to remedy the ill effects that existing truck and bus routes have on northern Miami's Central Business District and the port's ability to grow, which results in increased costs for port users and safety hazards.

The POMT project entails four coinciding construction projects and schedules:

Watson Island Construction

Watson Island is a diamond-shaped area of land located just north of Dodge Island, where the

Port of Miami is located. Watson Island is currently connected to the mainland by U.S. Route 41/MacArthur Causeway and I-395. Watson Island construction includes realignment of the island's frontage road on the south side of the island and the eastbound and westbound lanes on MacArthur Causeway to make room for the POMT dig-in site. Work on this portion of the project began in May 2010, and is scheduled for completion in October 2013.

MacArthur Bridge Work

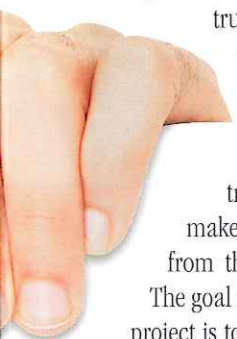
A more than 2,500-foot-long structure, the MacArthur Bridge was completed in 1997. The MacArthur Bridge work includes construction of an additional bridge lane in both directions, which will expand the current six-lane structure to four, 12-foot traffic lanes in each direction, 10-foot-wide inside and outside shoulder lanes and a 6-foot sidewalk. Construction on the MacArthur Bridge widening began in November 2010, and will continue through December 2013. Along with accommodating projections of increased traffic to the Port of Miami, the bridge's expanded width creates acceleration/deceleration lanes for trucks and buses using the tunnel.

Dodge Island Construction

Dodge Island, formerly three man-made islands, facilitates the Port of Miami. For the POMT project, a bridge separating inbound cruise traffic from outbound cargo traffic will be dismantled and replaced with a new roadway and three overlapping bridges that create room for the tunnel's entrance and exit ways. Dodge Island construction began at the same time as work on the MacArthur Bridge began in November 2010, and is to conclude in July 2013.

Eastbound/Westbound Tunnel Work

The spotlighted feature of the Port of Miami project includes the boring of the two, two-lane 3,900-foot-long tunnels, which began in late-October 2011 on Watson Island. The first of the twin-barrel structures to be bored is the eastbound tunnel and will take approximately eight months. Work then begins on Dodge Island for the westbound tunnel – which is set to conclude in April 2013. Work on the tunnels' interiors will continue from January 2012 to January 2014.



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Port of Miami Tunnel Project

Tunnel Vision

When completed, the POMT will add to the nation's inventory of more than 365 highway tunnels. According to a lotsberg.net listing of the longest U.S. road tunnels, the Ted Williams Tunnel in Boston is the nation's longest immersed structure at 2,600 meters. At 3,900 feet (1,188.7 meters), the POMT will be among the nation's 20 longest immersed tunnels. The POMT will become Florida's longest road tunnel, surpassing the 285-foot-long New River Tunnel, also known as the Henry E. Kinney Tunnel, in Fort Lauderdale.

Worldwide, tunnel technology has allowed these structures to span great lengths. The world's longest road tunnel is Norway's Laerdal (15.3

miles), and the longest submersed road tunnel is Japan's Tokyo Aqua (5.97 miles). About the time the POMT opens to traffic, construction is expected to begin on the world's longest immersed road/rail tunnel. At 18 kilometers long (11.3 miles), the Fehmarnbelt will connect Denmark and Germany. Europe's biggest infrastructure project is expected to commence in 2014 and open to traffic in 2020.

The POMT is calling upon the world's best tunnel technology. The Port of Miami project is implementing the largest diameter soft ground tunnel boring machine (TBM) in the nation, and according to Denise Pojomovsky, the public information officer for MAT Concessionaire LLC, it is being closely watched throughout the world. "The geological conditions under Government

Cut are extremely unique," she said of the Biscayne Bay's soft limestone. "A tunnel has never been built in those conditions."

A TBM, sometimes referred to as a mole, utilizes a cutting process similar to an electric razor, where circular blades bore into earth ranging from soil to rock.

The borer currently winding its way eastward under Biscayne Bay consists of a cutter head with an outside diameter of approximately 43 feet. However, the more than \$45-million piece of machinery does more than burrow. Contained within the 457-foot-long TBM's trailing gear is an electrical, mechanical and guidance system that helps dispose of excavated material via a conveyor belt and place the tunnel's pre-cast concrete liner.

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Waiting to Exhale

Except for extreme athletes and magician/stuntman David Blaine, the average human, who is in good health, can hold their breath for about two minutes – or about the time to travel through a one-and-a-half-mile-long tunnel traveling at 45 mph.

According to a *Time* magazine article noting Blaine's world record 17 minutes and 4 seconds of holding his breath in April 2008, an average person in good health can increase their breath-holding capabilities with practice.

Blaine accomplished his feat with the help of two important factors – being underwater and consuming pure oxygen. When he set the world record while appearing on the Oprah Winfrey show, Blaine was submerged in a sphere of water. According to pulmonary specialist Dr. Ralph Potkin, who helped train Blaine for his feat, humans revert to their “mammalian” ways, as their bodies “instinctively” prepare to conserve oxygen. “Heart rate drops, blood pressure goes up and circulation gets redistributed,” Potkin told *Time*. Consumption of pure

oxygen and fasting – to allow lungs to expand more without bumping onto a full stomach – also aids you in holding your breath.

The record for a human holding their breath without the aid of water submersion or pure oxygen is 8 minutes, 58 seconds. A species of whale is known as the animal with the longest “breath-holding” capabilities, as its lung capacity allows it to hold its breath for up to two hours.

Built by German manufacturer Herrenknecht A.G., the logistics of shipping the TBM nearly 4,200 nautical miles to the Port of Miami is a story in itself. Parts production for the TBM was an eight-month process (March to October 2010), followed by a seventh-month-long assembly of the 2,500-ton piece of equipment. Following testing, the POMT TBM was disassembled and packaged for the trip to the United States. Trucks moved the TBM parts to the Port of Kiel, Germany, where they were lifted upon river barges and shipped to Port Rotterdam, Holland, where it was lifted upon an ocean carrier this past June.

Shipped via ship and plane, the TBM's heaviest parts arrived at the Port of Miami in 21 heavy-haul pieces, 75 regular cargo and 20 containers in June. Upon the rest of the pieces arriving by plane, it took three months to re-assemble the tunnel borer. According to the POMT Public Information Office, “The cutter-head had to be assembled and welded together before being lowered into the shaft, or launching pit (located on Watson Island) by an 800-ton crane ... The first of the six pieces of the TBM shield were lowered into the shaft on August 10 (2011). The remaining parts of the shield were lowered one by one daily after that.” The pre-constructed launching pit, located in the median of the MacArthur Causeway, was 400 feet long, 100 feet wide and 40 feet deep.

Named “Harriet” by the Miami-Dade County Girl Scouts in honor of Harriet Tubman, who led several rescue missions of fellow slaves through the Underground Tunnel during the Civil War – the TBM was assembled by late October. Following testing, tunneling began in early November.

“It will take approximately eight months to bore the first tunnel, and the machine will pop out at Dodge Island,” said Pojomovsky. The tunnel process from Watson Island to Dodge Island is scheduled to continue through May 2012, at an average speed of one inch of excavation a minute and more than 41 feet a day. With the assistance of a 12- to 16-person crew working inside the TBM and a 12- to 14-person on-surface crew, Harriet will operate 20 hours a day, seven days a week. The TBM is scheduled for four hours of daily maintenance. As mentioned, a

precast concrete liner is simultaneously moved into place when the TBM carves a path. Each liner ring consists of eight segments, and upon each of the tunnels' 12,000 segments being

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Port of Miami Tunnel Project

Deep Tunnel Coincides with Deep Dredge

Several projects currently underway in the Port of Miami are on a deadline to coincide with the re-opening of the expanded Panama Canal in fall 2014.

When Gov. Rick Scott asked for \$77 million to be allocated to the Port of Miami's Deep Dredge Project, he was joining many Floridians in their desire to make the Port of Miami a major port of call for the new generation of larger cargo vessels passing through the Panama Canal.

The Panama Canal, a more than 50-mile-long canal that provides access between the Atlantic and Pacific oceans, is currently being expanded to handle larger cargo ships. Ports around the world are doing the same to remain competitive, as America's trade with East Asia is expected to "undergo an increased shift from Pacific ports to Atlantic ports. The Port of Miami's Deep

Dredge project will deepen the channel by 50 feet so larger ships can gain access to the port. The deepening of the Biscayne Bay's ship channel is being promoted as enabling the Port of Miami to become a "first port of call" for ships through the expanded Panama Canal.

Once the dredging occurs, the Port of Miami can accommodate the larger Post-Panamax vessels, as it is only 2.5 nautical miles from the sea buoy to the port's berths. When completed, the Port of Miami will be one of only three U.S. eastern seaboard ports that can accommodate the world's largest container vessels.

The Deep Dredge project will allow the Port of Miami to double its current cargo output, which is currently listed at 7.42-million cargo tons annually, and will create up to 33,000 trade-related jobs.

The Port of Miami currently supports 176,000 employees, as the port handles nearly 2,500 vessels (cargo and passenger) and more than 4.3 million passengers annually. Generating nearly \$95 million each year, the Port of Miami is Miami-Dade County's largest revenue generator next to the Miami International Airport.

Another transportation project currently going on at the Port of Miami and set to be completed in 2013, is work to restore rail service between the port and the Florida East Coast Rail Yard in nearby Hialeah. This will again provide direct cargo access to the national rail system and further enhance South Florida's intermodal capacities.

(Source: www.miamidadegov.gov)

placed a grout is pumped between the liner and excavated area to seal them into place.

After excavating to a depth of 120 feet below Biscayne Bay and reaching its destination 3,900 feet away on Dodge Island, Harriet will be partly disassembled and moved 180 degrees. Once re-assembled, Harriet is scheduled to commence digging the west tunnel this September. "It will take about three months to disassemble some of the machine, turn it around, and reassemble it again. The second tunnel, the westbound one, should take about six months to excavate," Ponomovsky added.

"If I could explain this project in one word it would be 'amazing,'" said FTBA President Bob Burleson, who toured the project with FDOT District Six Secretary Gus Pego, P.E. "I guess I didn't quite grasp the magnitude until I went down there to see it firsthand. It's not like we build tunnels in Florida everyday."

Most impressive to Burleson is the TBM. "The engineering that is required to build this thing

is just unreal. I was watching the way that the tunneling machine works and just trying to figure out in my mind how anybody could design a machine that could do all those things. But the borer is just kind of the beginning of it. You have to get the material out of there, and then you have these precast panels that make up the lining of the tunnel ... It's just amazing to me how this machine does all that.

"And you have this control room where you have these guys operating this thing; it's a long way from when I started, and a D8 ripping rock out of a mountainside. It's pretty amazing to me."

Along with the TBM's use on the Biscayne Bay's soft strata, the Port of Miami project is anxiously being watched for its unique public-private partnership (P3) contract. Because of current congestion in and around Miami and the Port of Miami — not to mention a projected increase to 70,000 vehicles a day by 2033 — transportation officials needed problem-solving answers today. But with the FDOT and fellow public sponsors Miami-Dade County and the City of Miami

not having the necessary funding available, it sought private funding to help deliver the project earlier.

The Port of Miami P3 involves a 35-year concession agreement that includes 55 months for the project's design and construction, and financing, operation and maintenance. Because of the complexity of the tunnel, FDOT believes the P3 approach transfers the majority of construction cost overruns, schedule delays, long-term operation costs and maintenance to the private-sector partner — which is MAT Concessionaire LLC. If MAT Concessionaire underperforms, FDOT can reduce payments. "Such a financial incentive will ensure that the organization builds a quality product and operates and maintains the project in first-class condition," according to the department's website.

MAT Concessionaire, formerly known as Miami Access Tunnel LLC, was formed solely for the Port of Miami project and partnering with FDOT. The concessionaire is being financed by two groups — Luxembourg-based Meridiam In-

Infrastructure Finance SARI, which is comprised of nine banks and is providing 90 percent of the equity, and France-based Bouygues Travaux Publics SA. MAT Concessionaire teamed with key subcontractors in designing, constructing and operating the project.

“Local unemployed people, local vendors, minority businesses and other specialized companies around the state are getting a chance to work on this project,” Pojomovsky said. “Our goal is to utilize materials and services locally, whenever possible.”

Under the concession agreement, FDOT will make “milestone payments” of up to \$100 million each throughout the construction phase. Upon completion of construction, FDOT will make a \$350 million payment to MAT Conces-

sionaire – which it will use to repay debt and equity. Through October 2044, the concessionaire will receive “availability payments” from FDOT for continued service quality. At the end of the 35-year concession period, the POMT and the area’s contracted infrastructure will be returned to FDOT. If MAT Concessionaire underperforms, it will not receive a full payment.

“The way the contract is designed, there are no tolls in the concession agreement,” Pojomovsky said. “So the private-sector assumes all the risk.” When the contract was inked in 2009, it was considered the North American P3 deal of the year by *Project Finance* magazine.

The Miami-area as a whole, the cruise traveler, cargo deliverer and a multitude of industries are collectively holding their breath for the comple-

tion of the Port of Miami project. However, construction is currently providing a much-needed breath of fresh air to the local economy. “So far, we’ve put to work over 4,000 people – both directly and indirectly,” Pojomovsky said. “The contractor, Bouygues Civil Works Florida, has surpassed 400 direct hires.” She added that the design and build portions of the projects have provided work for an additional 588 vendors and subcontractors.

“The magnitude of the project is just more than I anticipated, and the number of people that they have working is obviously great,” Burleson said. “There are several local subs that are having an opportunity to participate and local material suppliers that are having an opportunity to furnish materials, so that is certainly positive.”



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