

A red car is driving on a highway, blurred to indicate motion. Above the car is a large, orange gantry structure with multiple levels of beams and cameras. The background shows a blue sky with white clouds and a concrete barrier with trees behind it.

Closing the Miami-Dade Expressway Authority
system sets the stage for open-road tolling.

CASHLESS CONVERSION

Just before midnight on June 6, 2010, a motorist stopped at a toll booth on the Miami-Dade Expressway Authority's Gratigny Parkway, handing the attendant \$1.25 to cover the toll. As the car pulled away, routine stops to pay a cash toll — repeated thousands of times a day for years on the expressway — came to an end.

FOUR YEARS EARLIER, the Miami-Dade Expressway Authority's board had approved a master plan that was ready to be implemented in conjunction with HNTB, its general engineering consultant of record. The plan included direction for future system expansion and established the framework for converting the entire expressway system to all-electronic, open-road tolling. This massive undertaking involved installation of gantries and demolition of existing cash plazas, complete reconstruction of the existing expressway facility in the vicinity of the gantries and implementation of technology in the lanes and in the back office that enabled tolls to be collected exclusively electronically.

"The master plan looked at open-road tolling as the first critical step in helping the Miami-Dade Expressway Authority advance toward more toll and intelligent transportation system technology to maximize operational efficiency and capacity," said Susan Carlson, manager of toll facility planning for HNTB. "The project would be one of the first conversions in the country, particularly of this scale, to all-electronic tolling."

The Don Shula and Snapper Creek Expressways followed Gratigny Parkway as electronically tolled roads on July 17, 2010. The system's two remaining expressways will be converted between 2012 and 2014.

As general engineering consultant, HNTB managed the project from the planning stages through procurement, and has overseen engineering and technology design development, installation and testing. To create efficiencies and meet the project's aggressive schedule, HNTB initiated a unique procurement process hinged on a combination request for proposals that allowed vendors to propose either on the toll systems integration or the back-office work or both. The approach resulted in competitive pricing on both portions of the project, and toll contract work began in early 2009. HNTB also prepared a design-build procurement package for the civil engineering components of the project as well as oversaw the entire civil design that began in mid-2009.

A CLOSER LOOK AT THE MDX SYSTEM



“From my perspective as executor, I was reassured that, in HNTB, MDX was getting seasoned professionals who knew what it took to put in a toll system,” said Javier Rodriguez, executive director of the Miami-Dade Expressway Authority. “They guided us throughout the process with their expertise, and assisted staff on both the engineering and system integration side, drawing on their experiences with similar projects.”

AN EQUITABLE SOLUTION

Two hundred twenty-two urban-lane miles comprise the MDX system in south Florida. With the exception of Snapper Creek Expressway, all of the facility’s roads were tolled, but multiple open-entry points permitted nearly 60 percent of motorists to avoid paying tolls, a situation the authority decided to remedy with its conversion to open-road tolling.

“The technology reduces accidents and congestion associated with toll plazas and, when all of the expressways are converted, also will give the authority the option of introducing congestion pricing.”

MARY CONWAY
PROGRAM MANAGER
HNTB

“This project was more important for us than for the typical toll agency,” said Alfred Lurigados, director of engineering for the Miami-Dade Expressway Authority. “Most agencies collect from all their users and, when they convert to all-electronic tolling, it’s a different scenario than what we were dealing with. We had to establish tolls where none existed before.”

“Closing the system was key to achieving the expressway authority’s goal of ensuring that all users pay for the portion of the system they use,” Carlson said. “A closed system is more equitable for users, and also generates additional revenues that can help the agency develop and implement the expansion and system enhancements that are part of its long-range plans.”

After the open-road tolling conversion is complete on all five roads in the system, MDX expects to collect tolls from 97 percent of its users.

FROM CHALLENGE TO COMMUNITY SUPPORT

A conversion of this magnitude created numerous challenges, the first of which was to create community support for a closed and cashless system.

HNTB supervised public outreach for the project, which included grassroots public meetings led by the GEC and a media campaign spearheaded by MDX to help motorists understand that the conversion was based on fairness for all users. According to Mary Conway, HNTB program manager, that perspective ultimately gained wide acceptance.

The ability to collect tolls through SunPass® — Florida’s statewide electronic toll collection system — or via visual license plate image processing also has helped build community support, in part because it has permitted the expressway to modify its customer interactions.

“Our previous role of violation enforcement has changed to one of customer service,” said Stephan Andriuk, toll director for the Miami-Dade Expressway Authority. “We have hired skilled customer service representatives to field phone calls, and the 20 percent of our drivers who don’t have SunPass transponders no longer are toll violators. They are accounts receivable customers, and we simply send them an invoice.”

TECHNOLOGY BEHIND THE TOLLS

From the planning stages on, technology was the lynchpin in achieving a successful conversion to open-road tolling.

Working closely with the authority, HNTB developed highly detailed technological specifications for the project, vetted the toll integrator’s design process, identified key areas that needed to be modified to meet the expressway’s requirements, ensured security and redundancy and completed essential testing in time for the system to go live.

For drivers who have not yet acquired transponders, the technology enables sophisticated optical character recognition of license plate photos captured at the system’s gantries. State-of-the-art database matching automatically enters the license plate image into the database, identifies the car’s owner and generates an invoice.

“The Miami-Dade Expressway Authority was committed to using the highest level of technology to achieve *(continued)*



The Miami-Dade Expressway Authority’s toll collection through SunPass and the use of visual license plate image processing changed the role of its employees from violation enforcement to customer service. Cars without a SunPass transponder are detected, and owners are issued an invoice for use of the system.

free-flowing traffic in this urban area,” said Conway. “The technology reduces accidents and congestion associated with toll plazas and, when all of the expressways are converted, also will give the authority the option of introducing congestion pricing.”

FUNDING FOR THE FUTURE

“As the local expressway authority, it’s our job to provide mobility in our community,” Rodriguez said. “Closing our system allows us to get the revenues necessary to meet our community’s needs. We can process more vehicles in the open-road environment than in the plaza environment, and it allows us to fund the future, an important component in our strategic plan. Our experience doesn’t mean that all-electronic tolling will work everywhere. But, from our perspective, it is a solution that should be considered in urban areas.”

All roads in the expressway system either intersect with or lead into Florida’s state highway system, and some already join the Florida Turnpike. Eventually, the Miami-Dade Expressway Authority plans to use funds generated from open-road tolling to extend additional expressways to the Turnpike, creating seamless community connectivity.

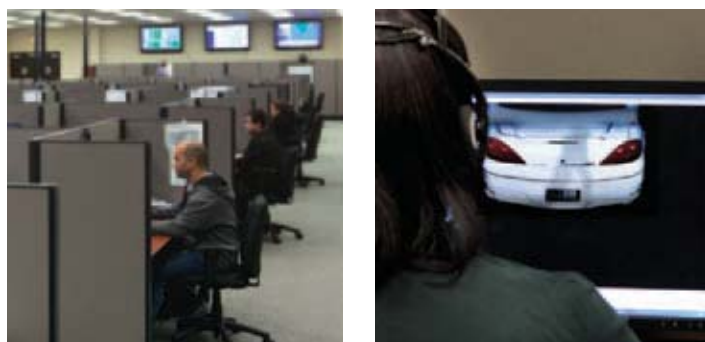
As a regional transportation partner, the Miami-Dade Expressway Authority works with the Florida Department of Transportation, the transit authority, Miami International Airport and other transportation agencies in southern Florida to create transportation systems that meet the needs of the state’s growing population.

“We could just collect tolls and invest back into our own system,” Rodriguez said. “Instead, we have become a local funding partner to build a project at the airport. We have partnered with the transit agency to allow them to run buses on our system. We can look at ourselves only as a toll road facility or as a provider of transportation solutions for our community. We prefer the latter.”

On that regional level, the expressway is working in conjunction with its transportation partners — and investing tolling revenues — to determine future facility needs and identify options for meeting southern Florida’s long-term mobility goals. ■

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THE OPEN-ROAD TOLLING ADVANTAGE

A complete open-road tolling system delivers benefits to both motorists and toll authorities:

Safety. Cashless toll collection dramatically reduces roadway accidents by eliminating the need for drivers to stop at a toll plaza.

Environmental friendliness. Motorists no longer need to slow down or leave their cars idling to pay tolls. The result is a reduction in noise and in auto emissions that contribute to air pollution.

Speed. Open-road tolling reduces congestion and helps keep traffic moving at highway speeds.

Convenience. Using license plate imagery, open-road tolling allows all motorists to be treated as customers, even if they don’t possess a system transponder.

Fairness. All-electronic tolling distributes the cost of the toll system evenly among users by ensuring that drivers pay based on miles driven.

Cost savings. Open-road tolling helps customers trim fuel consumption by eliminating stop-and-go driving. Customers who sign up for and use transponders to pay their tolls also pay a reduced rate.

Revenue generation. Collecting tolls electronically creates a more consistent revenue flow that can be used to maintain and expand the roadway system.