Open Road Tolling Spells Instant Relief for Chicago and Suburbs
An aggressive schedule, innovative planning and barrier-free lanes are changing the way motorists travel in Northern Illinois.

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October 29, 2006, was a day of celebration for the Illinois Tollway and its 1.3 million daily customers. On that warm autumn day, Gov. Rod Blagojevich and Tollway leaders waved through the first vehicles to use Open Road Tolling (ORT) lanes at the Waukegan Toll Plaza. With the new lane additions open there, Illinois became the first state in the nation to convert a system of traditional barrier-style toll plazas to ORT in less than two years — and celebrated the completion of a highway-speed, nonstop travel corridor from Wisconsin to Indiana.

After 22 months of accelerated design and construction, barrier-free Open Road Tolling had become a reality at all 20 mainline toll plazas in Northern Illinois. Instant relief for motorists with I-PASS transponders meant shorter commute times, fewer traffic delays due to bottlenecks, less air pollution and a safer Tollway. And it was all made possible by a unique partnership of design engineers, contractors and public officials collaborating on this innovative project led by the Illinois Tollway and its project management consultant, Burns & McDonnell of Downers Grove, Ill.

Open Roads
Compounded over many decades, traffic congestion from 1.3 million daily users had created a monumental problem for the Illinois Tollway System that surrounds the nation’s third most populous city. Based on the U.S. Department of Transportation's 2003 Transportation Statistics Annual Report, it takes "39 percent longer, on average, to make a peak period trip in urban areas compared with the time it would take if traffic were flowing freely."

In 2005 the Tollway kicked off its Congestion-Relief Program — Open Roads for a Faster Future, designed to improve travel times by rebuilding and/or restoring the majority of the system, adding many miles of new lanes, building the 12.5-mile extension of I-355 from I-55 to I-80, as well as the systemwide conversion to ORT. The Illinois Tollway maintains and operates 274 miles of interstate tollways in 12 Northern Illinois counties, including: the Reagan Memorial Tollway (I-88), the North-South Tollway (I-355), the Jane Addams Memorial Tollway (I-90), and the Tri-State Tollway (I-94, I-294, I-80/I-294). As much as 65 percent of the aging Chicago-area network had not been reconstructed since its roadways were built in the late 1950s.

The Congestion-Relief Program called for a large-scale conversion of mainline plazas to barrier-free electronic toll collection, or ORT. A concept first deployed in the United States in the early 1990s, this approach is designed to reduce slowdowns and increase traffic throughput. ORT drivers can maintain highway speeds through the plazas while their tolls are collected electronically by overhead equipment. The I-PASS electronic toll collection system...
had been in place for more than a decade. Yet, traditional barrier-style toll plazas were continuing to create roadway bottlenecks and congestion.

The Challenge
The Illinois Tollway launched its $327 million conversion to ORT in the spring of 2005, the project also required $402 million in accompanying mainline reconstruction and cash toll collection modifications. The major push was to incorporate ORT lanes at all mainline toll plazas before the end of 2006 — 116 open road toll lanes across the system — with all cash lanes updated by summer 2007. This translated into approximately $729 million in total program dollars. A systemwide toll plaza conversion to ORT for an existing U.S. system had never been attempted on such a large scale. Nor had a plaza system been completely converted at such an aggressive pace — less than two years.

During the project’s concept stage, the Illinois Tollway called on several Chicago-area consultants to help identify key components and project goals. The Tollway’s message to the designers and contractors was clear: The schedule is aggressive and it will be challenging to accomplish, and we need your collective help in making this project happen. Fast.

Integrated Team
Burns & McDonnell’s Downers Grove (Chicago) office was among those selected to participate. The firm’s work with the Tollway over the previous decade had included electrical and facilities upgrades to provide I-PASS capabilities at many of the mainline plazas, in addition to serving as construction manager on the first generation of I-PASS-Only lanes.

As part of this systemwide ORT conversion, Burns & McDonnell was assigned to study a single plaza. Located at the north end of the Tri-State Tollway (I-94), the Waukegan Toll Plaza is only minutes from the Wisconsin state line. The plaza had been in use since 1958 with the only modifications being the addition of I-PASS-Only lanes. To accommodate ORT, the facility’s redesign called for opening up additional lanes. Burns & McDonnell designers considered a variety of options for relocating the plaza, but the tight schedule and right-of-way acquisition limitations led to the decision to implement ORT, rebuild the cash collection lanes and upgrade the plaza facilities at the existing site.

While Burns & McDonnell and two other consultants were deep in a series of plaza geometry studies and traffic analyses, the true scope and complexity of this undertaking began to sink in with Tollway officials. For every site, every toll plaza, analysis led to more analysis — and more questions: How many ORT lanes are necessary? How many manual lanes will handle cash-only traffic? How much storage would be required at each location? As Tollway officials considered this level of detail for more than 20 plazas, they began asking consultants instead to define a prototype building and plaza design that could be incorporated on a systemwide basis.
Design by Charrette
At this point, a Burns & McDonnell architect suggested the idea of a “charrette” to gather as much information as possible quickly to form concepts for the prototype plazas. The charrette, an intense collaborative planning process involving all stakeholders, would be critical to incorporating all key wants and needs into a new design and creating a new plan of action. Burns & McDonnell agreed to lead those sessions.

Over the course of several days, two dozen staffers representing three consulting firms worked from 7 a.m. to midnight at Burns & McDonnell’s Downers Grove offices. All decisions were achieved by consensus. The first charrette resulted in a concept design of the toll plazas. A second charrette helped refine the initial design. Among the ideas generated were:
- Designing the plazas to include elements of the LEED certification requirements
- Avoiding any right-of-way acquisition to expedite the project schedule
- Redefining methods of money collection and reviewing alternatives for coin conveying systems
- Ensuring the ability to stage construction to maintain traffic flow and complete the project on schedule

Accelerated Solutions
Following the charrette, the Tollway hired eight more consultants as toll plaza designers. In December 2004, it selected Burns & McDonnell to lead the concept design phase and serve as design project management group for the $729 million ORT conversion. The firm also proceeded with its redesign of the Waukegan Toll Plaza and was hired under a second contract to provide technical design support to HNTB, the project’s overall program manager.

Critical to the project’s success was developing effective partnerships between the designers, contractors and Tollway staff to expedite and streamline the concept, design, bid and construction processes. Burns & McDonnell was responsible for managing work on 20 projects simultaneously. This required coordinating the development of new building concepts, infrastructure, plaza geometry, signing, review processes and contract management.

Close coordination throughout was essential. Initially, Burns & McDonnell organized small technical group meetings with all designers and engineers to define design criteria. Meeting twice a week, their primary task was to identify potential scheduling issues, address questions common to all plaza locations and develop specific recommendations that could be used by all designers to ensure continuity across the board. This enabled construction to begin even as design details were still being finalized.

The ORT delivery method itself was critical to keeping all elements of the program flowing. Burns & McDonnell partnered with consulting firm SE3 for its program delivery expertise and assistance with coordinating among the Tollway’s staff, designers and contractors. Great attention was paid to reviewing, modifying and improving the maintenance of traffic details to keep construction on schedule while keeping the driving public in motion. To accomplish this, meetings were held in advance of every stage change. Data collected was then presented to the Tollway for approval during early stages to avoid reworking the details later. By keeping all parties informed on a real-time basis, project teams provided rapid responses to all types of design issues and maintained the project schedule.
Please Pass Go
With completion of the Waukegan Toll Plaza in October 2006, ORT conversion was finally in place across the Illinois Tollway system. The availability of nonstop tolling lanes systemwide makes Illinois the first state whose entire mainline toll system has been converted to ORT in such a short time. Immediately, commuters, vacationers and commercial truck traffic moving into and out of the city experienced faster travel times and improved safety and traffic flow.

As a result of the ORT initiative in Illinois, many toll plazas feature new exit options and other refinements. Drivers without an I-PASS or E-ZPass transponder, or those who need to exit shortly after the plaza, can pull right into smaller traditional toll plazas where they pay cash to toll collectors or use I-PASS without impacting the free flow of traffic on the mainline. Other improvements were made to staff facilities, drainage and erosion control. The new control buildings incorporate significant green-design equipment such as solar panels, floor-to-ceiling windows and small building footprints that allow for green space within the plaza site.

Moving Forward
Perhaps the ultimate test of the Tollway’s success with new ORT lanes is time. Chicago-area commuters have widely applauded the benefits of ORT, with many reporting an average time savings of 10 minutes each way — time not spent in traffic or slowing down to pay tolls.

The ORT conversion also gained recognition from the American Council of Engineering Companies of Illinois. In presenting its 2007 Honor Award to the project, the council noted:

“The effect of this project has been nothing less than a complete change in the way the Tollway operates. Plazas are no longer a bottleneck or a barrier. As a result, the tollways are safer, air pollution is reduced and motorists save time and money.”

And finally, Tollway customers are responding with increased loyalty: approximately 80 percent of daily drivers currently use I-PASS to pay their tolls — among the highest usage rate of U.S. tollways.

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