

Express delivery

The Illinois Tollway maintains and operates one of the busiest transport networks in the US – 274 miles (440 km) of interstate tollways in 12 counties, including the Reagan Memorial (I-88), North-South (I-355), Northwest (I-90) and Tri-State (I-94, I-294, I-80/I-294). Its Congestion-Relief Program is an innovative and ambitious US\$5.3 billion plan to relieve congestion and reduce travel time. This, the first of three articles, examines an important part of that plan, Open Road Tolling, and how the Tollway is achieving its goal of 'Open Roads for a Faster Future'

In the US, by the end of 2006, the Illinois Tollway (the Tollway) is converting 20 mainline toll plazas to Open Road Tolling (ORT) for non-stop I-PASS travel. Jack Hartman, the Tollway's Executive Director, says that implementing ORT at mainline toll plazas is an essential part of his organisation's Congestion-Relief Program. "It is a significant endeavour that is technically challenging and has an extremely demanding schedule," he adds. "That we were able to reach Phase I (completion of nine ORT plazas) of the goal in less than eight months is an incredible achievement for a project of this size and complexity."

In this article we will look at the reasons for how and why the Tollway ORT Congestion-Relief Program will become a "happily ever after" story, starting with the selection of the right people for the right job.

Selection process

There are a number of key parties necessary to any industry project, and the people that make up those parties and their roles within a project are critical. The Tollway was very mindful of this. It wanted a true team effort and to be kept fully informed throughout.

Nine designers were selected for the ORT project, following advertisements in a professional services bulletin (this is posted on the Tollway website and sent directly to a mailing list of firms which request it). Evaluation of responding firms/bids and subsequent recommendation for approval of the best qualified to the Tollway's Board of Directors is carried out by a panel of representatives from the engineering and planning departments, the Illinois Department of Transportation and an outside industry member. Respondents must be pre-qualified by the state and the best-qualified firms are selected case by case for each job. The selection of a consultant is based on specific qualifications, experience and

expertise. For the ORT project, the selection of the design consultants required each firm to become part of a team, where co-operation was vital.

In early 2005, the chosen design consultants began work and met regularly with a contingent of Tollway staff from departments including engineering, toll services, building maintenance, roadway maintenance and traffic, communications, planning and environmental. In addition to the larger group meetings there were smaller sub-committees addressing issues that would be incorporated into all of the designs such as structures and drainage. One design firm worked on the prototype for all of the plaza buildings. This group approach and co-operation by designers was instrumental in converting nine plazas from concept to ORT in under a year.

Another innovation was the issuing of separate contracts for items which required long lead times - structural steel, toll booths and monotubes. Because conversion of the Cermak Toll Plaza on the Tri-State Tollway required the reconstruction and lengthening of two bridges, it was imperative that the structural steel

be ordered early in the design process.

Had the contractor waited until the project was awarded, ORT could not have been delivered on time. A similar approach was taken to ordering the monotubes that are used to mount the toll collection and violation enforcement equipment, as well as for fabrication of the new toll booths. A further contract was awarded to cover the rebuilding of the Wadsworth Road Bridge in advance of the contract to convert the Waukegan Toll Plaza to ORT.

Integrator

Electronic Transaction Consultants Corporation (ETC) was awarded the Toll Revenue Management & Maintenance Program contract, giving it primary responsibility for the successful implementation of ORT technology and a new toll collection system. There were four principal reasons for the choice: ETC had the only proven, reliable solution for at least three lanes of high-speed ORT traffic; it had a strong team of partnerships/subcontractors; ETC provided the Tollway with the flexibility to ultimately administer the system in-house ➤

The original timescale for delivery of Open Road Tolling was compressed from 10 years down to two at the requests of Illinois State Governor Rod R. Blagojevich



➔ if it decided to go down that route; and, finally, ETC's bid was competitively priced.

A critical factor was the confidence that the Tollway had in ETC's ability to meet an aggressive schedule. ETC has a reputation for innovation: it successfully delivered the system design and integration for the first all-electronic, open road toll facility in the US; has designed and implemented technically complex express ORT over four or more lanes; and has created advanced solutions for High-Occupancy Toll (HOT) lanes. ETC introduced the industry's first web-based toll solution suite, which includes modules for customer service, violation processing, audit and reconciliation, interoperability, facility server and lane control functions. As a result, it was felt that the company had the knowledge and skills required for a project of this stature.

Long-lead items such as the monotubes which would hold the tolling equipment were ordered under separate contract in order to ensure on-time delivery



Technology

ORT requires different lane architecture and technology capabilities to traditional lane configurations. Systems must be able to recognise and correctly record transactions with cars moving at highway speeds that may also be straddling lanes in the tolling zone. Additionally, if there is an in-lane equipment failure, it's just not possible to close an ORT lane to correct the issue. The system must be able to provide wall-to-wall revenue assurance and have immediate fault detection and failure protection.

ETC's RITE redundant lane control solution forms the heart of the new Illinois ORT system. It is designed to provide continuous operation across multiple lanes and shoulders. Additionally, one controller in the redundant pair controls all equipment in the tolling zone, multiple lanes and shoulder equipment. The controller accurately correlates the collective input from all equipment simultaneously. This ability to locate and accurately identify the correct vehicle to be tolled in real time, across multiple lanes, is required to accurately separate I-PASS customers from violators - the very essence of cashless toll collection.

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Matt Beaudet

The Illinois Tollway's RITE solution extends from the lane through the back office, including advanced systems for customer service and violation processing, as well as for central host and audit and reconciliation processes. ETC also designed and implemented the reciprocity system that enables the Illinois Tollway's I-PASS to be compatible with the East Coast's E-ZPass systems, giving motorists the advantage of seamless travel between the various toll authorities.

Choice of technology

The Idris® in-ground loop detection system was pre-selected by the Tollway for the ORT deployment. Idris is an automatic vehicle classifier used in all types of tolling solutions but was specifically selected for the first-ever ORT site in the US. This proven track record, along with its count and classification accuracy and plug-and-play nature, was held to make it the only suitable solution.

The field of vendors offering the Idris technology was limited to a handful which had experience deploying the ORT solution. Each vendor had similar approaches but again, according to Ted Hull-Ryde, ETC's Director of Special Projects, his company' was selected because of a proven track record.

Quite often in life a choice is made through cost. When planning and designing the project, the Tollway took a holistic approach: while responsibility for construction was awarded to the firm with the lowest responsible bid, selection of the integrator was based on the professional service provided - getting dollar value and obtaining the right solution for the project was the goal. The Tollway carefully considered the services the vendor could provide, the staffing levels, industry knowledge and field-proven experience. Experience and understanding of the Tollway's requirements were a paramount consideration and these concepts were also used in the selection of industry consultants.

Matt Beaudet, the Tollway's Chief of ORT: "We were committed to drafting the most comprehensive RFP through due diligence and incorporating the ABC's of a successful business - Accountability, Best Practices and Customer Service. From there, a multi-discipline review of the bids was conducted to find an integrator that not only met our technical, delivery and service needs but which shared our vision for the future."

Challenges – both foreseen and unforeseen

The Tollway's schedule was the project's driving force. In order to bring congestion relief to drivers as quickly as possible, the project's original 10-year timespan was condensed down to two years at the


request of Illinois Governor Rod R. Blagojevich. To put this in context, the design phase began early in 2005 but the Tollway was looking for completion of nine ORT plazas by the end of that year.

Technology is not the only consideration in a project of this size. The weather can always show its intemperate side, and so it did for the Tollway team. The launch of ORT at the Touhy Avenue Toll Plaza - sited on the Tri-State Tollway, one of the busiest roads on the system - was a major milestone in Phase I. Governor Blagojevich was to mark the occasion with an opening ceremony in the presence of representatives from the road building community. Everything was complete and operational, with only the road markings to be completed. The challenge arose when the weather turned too cold for effective application of the new toll plaza's road markings. Heated nozzles and water-based poly urea paint quickly had the job completed and the opening took place on time - just one example of the innovative solutions implemented to keep the project on schedule.

Conclusion

And so Governor Blagojevich, Tollway officials and their team of providers met a significant congestion relief goal as Phase I of the ORT programme was completed. Collecting approximately 2 million toll transactions each day, Illinois is the first state in the nation to convert a barrier toll plaza system to ORT technology.

The conversion of the Tollway's traditional toll plazas to a barrier-free system allows I-PASS users to travel at highway speeds while their tolls are collected electronically, reducing congestion and travel times. Vehicles without I-PASS, or those that need to exit shortly after a plaza, use smaller, traditional toll plazas to the right of the ORT lanes where they will not impact upon the free flow of traffic. Separating I-PASS traffic from vehicles paying cash improves safety by eliminating the need to change lanes and merge into traffic, and benefits the environment by dramatically reducing emissions at toll plazas.

Of ETC's role in the success of the industry's most ambitious and comprehensive ORT program, Hartman added, "ETC's commitment to our needs was simply unparalleled and unstoppable. They met every challenge with solutions, and proved time and again to be the results-based professionals needed to make system-wide ORT a reality for Illinois drivers" 

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