Confronting Aging Infrastructure: The Successful Restructuring of a Midsize Transportation Operator

By Frank McCartney

For small and midsize transportation operators, funding capital improvements is an ongoing and daunting challenge. In many cases, projects to extend the useful life of a bridge are put off in tight budgetary environments in order to meet the more pressing, day-to-day maintenance needs of an organization's transportation infrastructure. This is especially true for operators that rely upon toll revenues as their main source of funding. Over the course of several years, however, the problems associated with deferring needed investments can compound exponentially. What was once a relatively small maintenance project can suddenly become a major rehabilitation effort because it wasn't addressed earlier.

In addition to hindering capital improvements, limited fiscal resources can hamper a transportation organization's ability to plan for projected increases in the demand on its infrastructure. Forecasts that project marked population growth and increased traffic counts are of little help to an organization that lacks the funding to address the problem.

These were the challenges facing the Delaware River Joint Toll Bridge Commission in the late 1990s, when we undertook a comprehensive management overhaul and a fundamental rethinking of our approach to operating and maintaining our transportation infrastructure. In just a few short

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History Sets Stage for Overhaul

To understand how the Commission was able to implement this rapid and necessary transformation, a brief introduction to the organization is in order. A bi-state agency, the Commission operates 7 toll bridges and 13 nontoll bridges crossing the Delaware River between Pennsylvania and New Jersey.

For a midsize organization, the Commission's jurisdiction is sizable, covering nearly 140 miles along the river, from just north of Philadelphia to the New York State border.[1] In addition to the 20 bridges crossing the Delaware, the Commission owns and operates another 32 approach structures throughout its jurisdiction.

Established in its present form in 1934 by legislation enacted by the Commonwealth of Pennsylvania and the State of New Jersey, the Commission operates under a compact that was approved by the U.S. Congress in August 1935. Its mission is to ensure safe and efficient river crossings and, in so doing, facilitate commerce between the two states. Under the bi-state compact, the Commission is empowered to acquire, construct, administer, operate, and maintain such bridges and associated facilities as it deems necessary to advance the interests of Pennsylvania and New Jersey.

The Commission is governed by a board of 10 commissioners, 5 from each state, who meet monthly to review reports, provide oversight, and set policies that are carried out by the executive director and professional staff. The New Jersey members of the Commission are nominated by the governor and confirmed by the state senate for a three-year term, while the

[1]There are three exceptions to this jurisdiction: the bridges owned by the Burlington County (N.J.) Bridge Commission, the bridge linking the Pennsylvania and New Jersey turnpikes, and the Dingman's Ferry Bridge (Pa.).

Pennsylvania members are appointed by the governor and serve at his or her pleasure.

A major change to the Commission's compact came in 1984, when it was charged by Pennsylvania and New Jersey with assuming full financial responsibility for the nontoll bridges within its jurisdiction. (Up to that point, the funding needed to support those bridges came from annual appropriations from both states through state-levied taxes.) As a result, the Commission became a completely self-funded organization, with all of our revenues coming from the tolls we collect on our 7 toll bridges. Because a portion of those revenues is used to maintain and operate the 13 nontoll bridges, the latter have come to be known by the Commission as toll-supported bridges.

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Substantive Disarray

In an effort to identify opportunities for the Commission to operate more effectively and efficiently, the New Jersey Office of the State Treasurer, in cooperation with the Pennsylvania Office of the Budget, in the late 1990s initiated a high-level management review of the Commission. In addition to setting the stage for a comprehensive management reorganization, the report identified the need to strengthen the capital planning process as one of the most critical issues facing the Commission.

The report called upon the Commission to examine the adequacy of funding policies related to capital repair and replacement activities, a recommendation that arose from the concern that needed investments in

the Commission's bridges were being deferred due to a lack of available funds. Given the Commission's comparatively low toll-rate structure compared with that of other toll agencies—and particularly in view of the added burden of maintaining 13 nonrevenue-producing bridges—the management review team's concern was understandable.

Following the completion of the review, a new management team was put in place in 1999, including me as executive director. What we found was an agency in substantive disarray. The age and condition of the Commission's bridge inventory posed our most pressing near-term challenge. Little more than routine maintenance work had been performed on the bridges, which have an average age of 71 years. With 5 of the7 toll bridges more than 50 years old and 6 of the 11 vehicular toll-supported bridges more than 100 years old, this presented a major obstacle.

During the 1990s, investments for repairs, as alluded to earlier, averaged only $3 million per year. During that period, however, the Commission should have been investing an additional $15.2 million per year in the preventive maintenance of its half-billion-dollar asset base; the absent spending resulted in a 10-year catch-up gap of $152 million. This operational approach led to a bridge system in substantial need of improvements and enhancements to increase its safety and efficiency.

Meanwhile, population and employment growth significantly increased traffic volume on the bridges, with trends indicating that cross-river traffic congestion would only continue to worsen. Further exacerbating the problem was a growing, market-driven requirement for electronic toll collection and other major investments in intelligent transportation systems. At the same time, the need for robust, state-of-the-art security systems soon became evident to address the threat of terrorist activities.

A Fundamental Shift

The first step the Commission took to address the problems was to make a fundamental change in its operational framework. For years, the agency had operated

under a "fix what's broken" approach to bridge maintenance and repairs. A more prudent and fiscally sound strategy was needed. As a result, the Commission shifted to a "rehabilitate and renew" and "plan for system enhancements" tack.

As part of this shift, the Commission developed a 10-year capital improvement program, with initial funding of $526 million, that forms the basis for ongoing infrastructure and capital improvements extending beyond the 10-year horizon. The program focuses on four objectives: preserving, protecting, managing, and enhancing our bridges.

In response to new capital improvement needs, we are constantly updating our estimated costs for the program; the most recent figure, revised and updated in 2005, is $640 million. This encompasses the four main program objectives as well as smaller program components, including funding for vehicles and equipment and authorized investments in local communities for items such as road improvements.

The four objectives of our capital improvement program comprise the following:

- Preservation—for bridge rehabilitation and modernization;
- Protection—to safeguard our bridges, facilities, and customers;
- Management—for operational and service enhancement to optimize capacity and improve traffic flow; and
- Enhancement—for system expansion and construction of new transportation facilities.

Under the system preservation component, estimated expenditures to preserve the Commission's infrastructure will be approximately $183.2 million over the 10-year capital improvement program. Typical improvements include structural repairs and modifications; removal of lead-based paint and application of new, environmentally safe paint and coatings; and historic preservation.

The system protection portion of the program is currently estimated at $21.3 million. This figure includes installation of a state-of-the-art electronic surveillance/detection system to properly secure Commission bridge structures, roadways, overpasses, toll plazas, and support buildings. It also covers structural modifications to protect facilities from sabotage, as well as upgrades to communications networks.

The $70.6-million system management component of the program includes adoption of E-ZPass electronic toll collection on all of the Commission's toll bridges, as well as the future creation of open road tolling lanes on select bridges. Upgrades to the Commission's data and telecommunications infrastructure and implementation of intelligent transportation systems at key crossings also fall under the system management portion of the capital improvement program.

The largest segment of the capital improvement program is budgeted for system enhancements. Under our latest calculations, $323.6 million will be allocated to ensuring that the Commission meets the demands of a

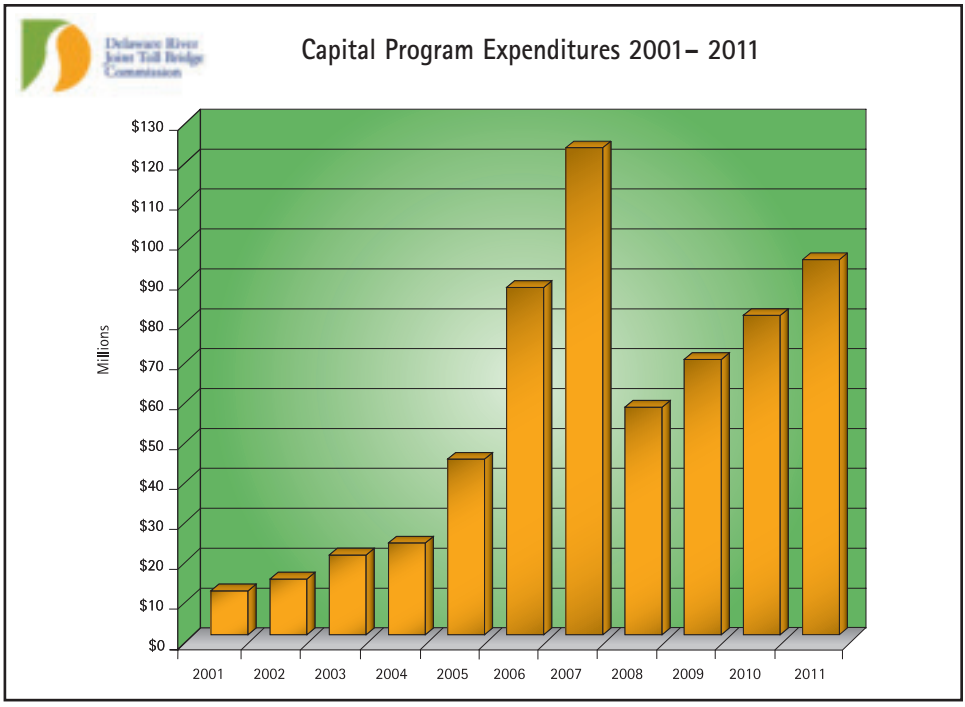
growing population and the accompanying increase in traffic and bridge usage. Already the Commission has conducted traffic mitigation studies for its Southerly and Northerly Crossings aimed at assessing and addressing future demands on our existing bridge infrastructure and the potential need for construction of additional Delaware River crossings. Under the system enhancement component, the Commission anticipates not only widening existing bridges but building new ones, as well. These efforts would have been unthinkable under the former "fix what's broken" approach.

Funding Capital Improvements

To make the capital improvement program a reality, the Commission implemented a number of fundamental organizational and operational changes designed to improve the organization's efficiency and effectiveness. Because the entire capital improvement program would be self-funded through toll revenue, politically unpopular changes in our toll structure would be necessary. Those changes included implementing the Commission's first commuter toll increase in more than 20 years and the first increase for truck and cash-fare vehicles in nearly 15 years.

The toll increases did present difficulties, including political and legal challenges. Most recently, the Commission successfully defended itself from a lawsuit filed by the American Trucking Associations and other parties in the trucking industry challenging our organization's right to raise tolls as we saw fit to maintain efficient and safe operation of our bridges. Bond proceeds enabled us to begin to move forward with the capital improvement program soon after the toll increases were implemented.

One of the first changes we made was to revolutionize the way we collected tolls. This included replacing aging mechanical coin baskets from the 1950s with newer, more efficient technologies, including installing the E-ZPass electronic toll collection system on all of our toll bridges. The resulting decreased congestion and improved convenience for our customers demonstrated the value of the capital improvement program relatively quickly. At the same time, an incentive program through E-ZPass offered daily commuters an up-to-40-percent reduction in toll fees for commuters who crossed Commission bridges 20 or more



times in a 35-day period. In the process, the Commission addressed the concerns of some of its most vocal commuter critics.

Implementing the Plan

As alluded to above, under our revised program, spending on capital improvements will increase as much as 15- to 20-fold per year. For a relatively small agency like the Commission, this presented an entirely new set of challenges. In response, we devised a comprehensive implementation strategy to ensure proper oversight and execution of the program. This included establishing metrics and standards to judge performance and hold both consultants and in-house staff accountable for the Commission's tight program goals. It also provided the discipline needed to ensure that various elements of the program remain within scope, on schedule, and on budget.

In developing the implementation plan, we quickly realized we would need to rely heavily on outside consultants to provide professional engineering

services. But we wanted to ensure there would be no outside delegation of accountability. To accomplish this goal, we opted for a balanced approach that included modest increases in our engineering staff with a moderate outsourcing of work. The Commission outsources to engineering consultants design work as well as construction management and inspection responsibilities. Responsibility for quality assurance and quality control rests fully with the individual consultant.

To ensure proper oversight of consultants and to help meet the increased workload associated with the capital improvements, we developed a new organizational plan for our engineering department. Under the plan, we procured the services of a capital program management consultant (CPMC), an engineering firm, to assist the chief engineer on a full-time basis with a range of tasks. The CPMC provides assistance in areas including programming, scheduling, and budgeting for the capital improvement program. The consultant also provides support in implementing and administering the procurement of professional services in accordance with Commission policy. Additionally, the CPMC serves as a staff resource to provide added oversight of Commission consultants and contractors and monitor the overall schedule and budget of the capital improvement program.

To meet the increased workload within our engineering department, we augmented the department's staffing levels by creating three new program manager positions dedicated to different components of the main capital improvement program objectives. The program managers have oversight

in the following areas: system preservation, system management/system protection, and system enhancement. Each program manager oversees his or her designated area of responsibility, with accountability in the areas of planning, design, and construction.

Providing Security

Up until the management review, security was provided by a team of bridge officers who patrolled Commission bridges, typically on foot. I use the term "security" very loosely, as the officers weren't permitted to carry firearms, weren't specifically trained in law-enforcement techniques, and were unable to patrol approach structures and other areas within the Commission's jurisdiction that extended beyond the bridges themselves. Their primary function, in fact, was to enforce weight restrictions and prevent overweight vehicles from crossing the bridges.

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The events of 9/11 made it apparent that this approach to securing our bridges and other structures was completely inadequate. An analysis demonstrated that creating a Commission police force would be extremely cost-prohibitive, especially considering the large size of the agency's jurisdiction. Instead, the Commission met with Pennsylvania and New Jersey officials to devise other options. The result was a first-of-its-kind bi-state policing agreement between the two states.

Under the new, long-term agreement, the Pennsylvania and New Jersey state police forces each dedicate 12 troopers and 1 sergeant, for a total of 26 law-enforcement personnel, to provide security and police coverage within the Commission's jurisdiction, paid for by the Commission. They patrol 24 hours a day, seven days a week, enforcing traffic laws, responding to incidents, and ensuring the security of Commission bridges and approach structures.

As a bonus, the Commission can also call on the state police for a wide range of additional, specialized services, including counter-terrorism units, S.W.A.T. teams, construction site security and enforcement, truck-enforcement units, arson/bomb investigators, mobile command posts, swift water rescue, and numerous other services. In addition, the

Commission has five dedicated dispatch operators exclusive to its operations. These are functions the Commission never would have been able to deliver within the confines of its own limited budget. The policing agreements, combined with the Commission's new electronic surveillance detection system, will provide a robust security presence, especially for an agency of our size, to ensure the safety of our bridges and our customers.

Additional Changes

Embarking on a capital campaign of this scope brings with it a range of additional challenges that can be unfamiliar to small transportation providers. Early on, we began the process of drafting and adopting new guidelines for the procurement of professional services, as well as formal recusal guidelines pertaining to conflicts of interest for commissioners and staff.

Beyond demonstrating a level of transparency to the public, media, and elected officials, these new guidelines also reassure consultants who respond to requests for letters of interest, requests for proposals, and requests for qualifications. As such, they have a clear understanding of how our procurement process operates and how our consultants are ultimately selected.

The Commission has also sought to address construction-related concerns among the public, local businesses, and elected officials as the capital campaign has progressed. Our bridges provide a vital link between communities on both sides of the river. To ensure that residents can travel to and from work on opposite sides of the river, the Commission laid out a capital improvement plan that ensures that no two adjacent bridges will be under construction at any given time. This minimizes detours and travel time for affected commuters and drivers.

Committing to a fundamental rethinking of an agency's approach to maintaining and caring for its infrastructure coupled with the political will to address the problem are the two most important elements of a successful restructuring.

In other cases, the Commission's bridges form the nexus of two towns on either side of the river, some of which rely upon tourism as a primary engine of the local economy. As a result, bridge closures can have a profound impact on businesses. To minimize that impact, we initiated an aggressive outreach campaign for each capital improvement project, meeting with local mayors and other elected officials as well as business leaders. Whenever possible, the Commission seeks to minimize impacts on local businesses, working with our consultants and contractors to ensure that repairs are performed during weekdays. The bridges then reopen on weekends to accommodate businesses and tourists before closing to traffic again on Sunday nights to resume repairs.

Positioned for the Future

Meeting the daunting challenges of an aging infrastructure is possible for small to medium-sized transportation providers. Based on my experience, committing to a fundamental rethinking of an agency's approach to maintaining and caring for its infrastructure coupled with the political will to address the problem are the two most important elements of a successful restructuring.

With the support and guidance of our commissioners, the Delaware River Joint Toll Bridge Commission is well-positioned for the future. Our aging bridge inventory will shortly be rehabilitated or, in some cases, completely reconstructed. This will enable us to meet future population and traffic growth on both sides of the Delaware River. Equally important, by addressing the problem at an early stage, the Commission was able to avoid what certainly would have been more costly capital projects in the near future.

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Glossary of Terms

CEN = Comité Européen de Normalisation (European Committee for Standardization)

CEN TC 278 = Technical Committee 278, responsible for road transport and traffic telematics, whose Working Group 9 has agreed upon the norms for electronic toll collection based on 5.8GHz DSRC

CESARE = A project set up by ASECAP and partially funded by the European Union with the intention of specifying, designing, developing, promoting, and implementing a common interoperable electronic fee collection system on European toll roads

DOT = department of transportation

DSRC = dedicated short-range communications

EFC = electronic fee collection

EPS = electronic payment services

ETC = electronic toll collection

GPRS = general packet radio service

GPS = global positioning system

GSM = global system for mobile communications

HOT = high-occupancy toll

HOV = high-occupancy vehicle

LCV = long combination vehicle

MEDIA project = Management of Electronic Fee Collection through Dedicated Short-Range Communication Interoperability in the Alpine Area

ORT = open road tolling

RFID = radio frequency identification

RSE = roadside equipment

SAFETEA = Safe, Accountable, Flexible, and Efficient Transportation Equity Act

TEA/LU = Transportation Equity Act: A Legacy for Users

U.S. DOT = United States Department of Transportation