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This edition of THINK examines how transportation agencies are optimizing their infrastructure — striving to address today’s maintenance demands while creating a platform for meeting tomorrow’s needs.

**Preserving the Built Environment**
To achieve a state of good repair while preparing for the demands of an ever-rising population, transportation leaders are harnessing strategies and solutions that are innovative, collaborative and paradigm shifting. Here’s what some of them are doing.

**Transform Ourselves First**
According to Paul Trombino, president of The American Association of State Highway and Transportation Officials and head of Iowa’s DOT, meeting the optimization challenge will demand a major shift in thinking — repositioning DOTs as disruptors who drive change through partnerships and transparent decision-making.

**Transit at The Crossroads**
Rising demand for public transportation, combined with rapidly deteriorating infrastructure, makes this a critical time for bold transit investment, says Richard White, acting president and CEO of the American Public Transportation Association and former transit head in Washington, D.C., San Francisco and New Jersey.
PRESERVING THE BUILT ENVIRONMENT

Striving to preserve what we’ve built while creating tomorrow’s infrastructure

Transportation agencies are faced with the daunting task of seeking balance between maintaining current infrastructure to ensure customer safety and convenience and initiating new projects to help expand capacity and improve mobility. The reality, unfortunately, is that there is no ideal or universal solution. Every state and city has unique transportation needs and challenges, with varying levels of population growth, age of infrastructure and pressure on existing systems. Available resources vary greatly as well, depending upon funding approaches, the condition of other government-owned infrastructure such as schools, and competition from the many other important line items in a state’s or city’s budget.

The Heart of the Matter: Money
Insufficient or unsustainable funding is commonly the most difficult challenge for transportation agencies nationally. However, there have been recent positive developments on this front. At the national level, the Fixing America’s Surface Transportation Act is providing $305 billion in funding over five years, giving states much-needed funding predictability to pursue a range of vital but stalled projects. Over the past few years, states also overcame political stalemates to set in motion a number of gas tax increases and other funding strategies, often garnering public support for such measures at the polls.

Funding maintenance has been a challenge even for states well-known for innovation. Ten years ago, Indiana made history by leasing its East-West Toll Road to a consortium for 75 years, devoting the one-time $3.8 billion payment to mega projects that had been languishing. Now, as the funding pool runs down, the state has been advancing a steady stream of funding initiatives, aimed mainly at preservation – improving pavement and addressing deficiencies in bridges, in particular. The state’s legislature approved more than $1 billion in funding to improve state and local roads and bridges.

In many cases, transportation agencies have turned to user fees to drive revenues. For states currently considering tolling strategies, there may be good news from a report issued by the International Bridge, Tunnel and Turnpike Association. In its February 2016 National Toll Facilities Usage Analysis, the association reported that in 2015 drivers took 5 billion toll trips involving toll transactions, 328 million more trips than 2014’s 4.7 billion – a 7 percent increase. The survey included 31 toll facilities across the United States and may bode well for states looking to use toll revenue projections for negotiating leverage in the municipal bond market and public-private partnerships.

Some major transit agencies are leveraging the P3 approach to fund significant expansions of their systems. This year, Denver’s regional transit agency, RTD, is opening five new transit lines, a first in public transportation. Funding for these new lines, comprising 36 miles of new commuter rail lines, was made possible in great part by a concession agreement between RTD and Denver Transit Partners, a consortium of private-sector partners. Meanwhile, in the nation’s capital region, a new P3 contract is poised to create 16 miles of additional...
light rail service by 2022. The Maryland Department of Transportation and MDOT’s Maryland Transit Administration inked the deal in June 2016 with concessionaire Purple Line Transit Partners, LLC, a consortium of industry leaders.

**Solutions: Fixing with Flexibility**

The Moving Ahead for Progress in the 21st Century Act of 2012, among other positive effects, has created a focus on achieving a state of good repair nationally with an emphasis on more effective asset management and performance planning. This focus has been continued in the FAST Act.

Fortunately, transportation agencies still have broad flexibility in how they pursue a state of good repair. In one example, some DOTs that are already spending to resurface roads have been able to expand capacity at the same time, yet with only marginal additional investments. Reversible lanes, for example, have become an increasingly viable strategy for reducing congestion during peak travel hours, thanks to sensors and data analytics that can change traffic direction in selected lanes based on actual congestion levels.

Similarly, technology is helping more DOTs to open highway shoulders to vehicle travel in very congested urban areas. Sensors, cameras and variable signs can be installed as part of a broader resurfacing program, dramatically increasing rush-hour capacity without significantly increasing costs or extending the construction timeline.

Transit agencies across the nation are making similar technology investments to improve safety and convenience today while creating a platform for service enhancements in the future. In the southeast, the Metropolitan Atlanta Rapid Transit Authority is overhauling its automated train control and Supervisory Control and Data Acquisition computer systems through a technology partnership. Through a new, integrated technology platform, MARTA will be able to direct train movements, control power and rail power, and improve monitoring and communications. Meanwhile, in the Midwest, the Chicago Transit Authority in 2015 leveraged the smartphone platform to launch its Ventra Mobile App, which streamlines the payment experience for transit riders who travel on CTA’s trains, buses and related assets.
Collaboration:
San Francisco Bay Area Transit
The 28 transit agencies that serve the San Francisco Bay Area have a common challenge to achieve a state of good repair that can sustain economic growth and provide dependable mobility. At the same time, a rising population is driving demand for more widely spread, efficient transportation options. To complicate matters, each of these agencies has its own constituencies, which puts pressure on decision makers to explore creative solutions beyond traditional spheres of influence.

It was in this spirit of exploration that influential leaders from several area transit agencies, as well as Oakland Mayor Libby Schaaf, gathered for a forum in March 2016 to discuss broader strategies for balancing maintenance and expansion demands. At the HNTB THINK: Infrastructure Forum, there was a general sense that collaboration among transit agencies is essential to meeting the repair-and-expand mandate, while some suggested that a unified regional agency might help to achieve vital synergies. Such cooperation also would position the transit agencies to compete more effectively for federal funding.

Participants also discussed how transportation agencies can strategically harness rising land values surrounding transit hubs to help fund maintenance or future enhancements. The group emphasized the need to appeal effectively to voters in advance of ballot measures, which is greatly assisted by synching messages of transit agencies to clarify how the envisioned new projects will improve daily lives of voters.

Reform: Massachusetts MBTA
In recent years, the Massachusetts Bay Transportation Authority, which operates subways, buses, commuter rail and ferries, has been grappling with a host of issues. In early 2015, the state’s governor appointed an expert panel to explore these issues, which range from escalating maintenance and operating costs, to performance gaps, to criticisms of how the system was being managed. The panel’s April 2015 report, referred to as Back on Track, urged the state to pursue a reform-over-revenue strategy to hold the line on budget increases while systematically addressing numerous issues they identified in their report. Soon afterward, a governor-appointed Fiscal and Management Control Board was created to provide new MBTA oversight and management support, and increase accountability. The Board’s mandate is far reaching, encompassing governance, finance, agency structure and operations, with the aim to recommend actions that would improve transparency and system stability.

State of good repair has been a major focus of MBTA investment over the last fiscal year. They have invested more than $600 million on deferred maintenance, which includes a winter resiliency program, station improvements and upgrades to tracks, signals and power systems. The state also is planning to replace its aging bus fleet.

Other actions have been aimed at increasing revenue. Among other steps last year, the commuter rail system added 64 new conductors to bolster fare collection and mitigate fare evasion. In June, the system announced that fare revenue for fiscal year 2016 to date had risen 5.8 percent, compared with fiscal year 2015. New technology enhancements being considered are aimed to further drive revenue increases and rider satisfaction. And, in May 2016, the system launched its first non-stop service between Boston and Worcester, which shaves an impressive half hour from the trip for commuters between those cities.

Balance:
Often in debates about spending there is a need to make “tough choices,” in which one priority must be sacrificed or postponed in order to pursue another, more urgent or critical one.

Achieving an optimal balance will demand a new level of creativity, cooperation and commitment from the entire spectrum of transportation stakeholders, in both the public and private sectors. It will demand that we sketch out ideas together - those that help us harness new ideas, innovations and technologies that lead to safer, more efficient and more sustainable transportation.
Optimizing today’s infrastructure means transforming our departments, approaches – ourselves – for the future

By Paul Trombino III

Over the past year, I’ve had the privilege of working with transportation leaders across the country by serving as president of The American Association of State Highway and Transportation Officials. It’s given me an opportunity to learn about their impressive innovations and successes as well as the challenges they face as they strive to deliver a world-class transportation infrastructure across our great country.

I have spent nearly 25 years in the transportation industry, currently as head of the Iowa DOT, and believe that we are at an important crossroad, one that demands that we shed old ways of doing business to become innovators, problem solvers and disruptors.

Transportation funding has been the hottest topic among DOT leaders and politicians coast to coast. Everyone agrees about the need to maintain a safe, effective system. Thus, the debate usually swirls around a perceived conundrum: how to build for the future while preserving what’s already been built. In my view, there will never be sufficient funding to accomplish both objectives. This means we really have just one choice, to invest in the infrastructure most critical to our future.

Consequently, this also means that we must deliberately choose which existing assets to no longer prioritize and eventually allow to go out of service. We must use our existing resources and guide our investments using a decision process that is data-driven, targeted and tactical. The essence of good strategic planning is deciding what you are not going to do. For example, if there’s a deteriorating bridge, before we begin investing in restoration we must ask hard questions: How is the bridge used? What is the volume of traffic, and what comprises that volume (specific products, needs of the products, value of the products)? Does it ease connections broadly as well as serve a purpose locally? What other bridges are nearby and what is their condition? Does the bridge serve a critical business connection? Does the bridge serve broad seasonal movements critical to the local economy?

Such a process, applied across thousands of bridges and roads, can help to free up funds for the infrastructure needed to meet tomorrow’s mobility demands. If we do not make these tough choices now, we’re likely to accelerate the costly deterioration of our assets with potentially even tighter fiscal restraints than we’re facing now.

It’s important to acknowledge that leaders of states across the nation have advocated for – and won – support for increases in transportation funding. Here in Iowa, for example, Governor Terry Branstad won bipartisan approval for a 10-cent state

WE MUST USE OUR EXISTING RESOURCES AND GUIDE OUR INVESTMENTS USING A DECISION PROCESS WHICH IS DATA-DRIVEN, TARGETED AND TACTICAL.
fuel tax increase last year, a necessary development for the state and its slate of vital transportation improvements and stewardship needs.

Yet, if anything, these funding initiatives elevate the level of expectation DOTs have to spend dollars as wisely as possible. Every investment decision we make has to deliver value to customers in improved safety, mobility and economics.

**DOTs: From Stewards to Disruptors**

Clearly, we must make tough decisions about which elements of yesterday’s infrastructure to preserve. And to do this effectively, we have to envision what tomorrow’s infrastructure will need to deliver. This means exploring complex questions such as: *What are the emerging needs and expectations we’ll need to address? What transportation improvements will be critical to help businesses thrive? How will technology change the way customers use the system? How must the system change to create better outcomes?*

Transportation is changing at an increasing pace. Look around: every tech company is focused on transportation-related innovations. Whether it’s about getting better information to consumers or bringing forth autonomous vehicles, these companies are disruptors who introduce changes to the transportation game continuously.

This is why I view organizational transformation as the No. 1 task that DOTs must undertake to remain relevant and enable better outcomes in the future for our customers. We must climb out of our traditional box and join the ranks of the “disruptors.” DOTs are well positioned to create positive disruption that can lead to improved safety, mobility and economics of the system. We can convene and partner with other private disruptors to accelerate change. We have the deep insights in our transportation infrastructure, its capabilities and limitations, and how it’s performing at any given time. We are driven by the public’s interest. These qualities form a strong foundation for building a new culture of innovation and partnership for positive change.

**Risk Advantageous, Not Risk Averse**

Within the DOT, culture change begins by giving team members the freedom to be risk advantageous, rather than risk averse. This means thinking about better solutions, and actually trying them, is not only encouraged but expected. Perhaps 30 percent of these ideas will be so phenomenal; in which case, they will move not only the DOT forward but will create remarkable outcomes in safety, mobility and economics for our customers.

But, what about the 70 percent of ideas that don’t work out? The fact is that even those ideas have significant value, because they are
essential milestones in the journey of learning, both for DOT employees and leaders who elicit and champion innovation and creative ideas.

As I noted, some ideas completely reframe our view of how a certain process should be executed. Driver’s license renewals, for example, have traditionally represented a costly activity for states and a tedious chore for drivers. Several DOTs, including Iowa, are now providing self-service kiosks for certain types of license renewals. These kiosks have a range of security measures, built in cameras and other features that let a customer walk up, process the renewal and walk out with a new license a few minutes later.

We all can acknowledge that, not so long ago, merely describing such a process might have drawn ridicule. And, yet, here it is. What’s more, if we are truly innovative, we know that kiosks themselves must be challenged as a concept. This is why the Iowa DOT is at the forefront of mobile driver’s licenses (mDL). The mDL will allow seamless connectivity for identity verification at the airport, at a hotel, or even with law enforcement without ever removing anything from your wallet or having to show someone your phone.

Data and Dialogue
At a fundamental level, state DOTs must dramatically change the way they interact with those who are striving to achieve certain goals through new or upgraded transportation infrastructure. In the past, if a community sought to launch a project, the state DOT would lay out the process and the rules to be followed.

In the past, if we believed that a project was unlikely to reach the threshold for being funded and built, we would still move forward with the process. On the surface, this would seem to represent “fairness” in that all projects should be allowed to compete for funding, but in reality we were perpetuating a system of demand based on want versus need.

At the Iowa DOT, we have shifted that paradigm. For example, if a community comes to us with a request for a new highway interchange, we present them not with the standard process but most importantly with a conversation and dialogue trying to determine if this project is want or need. We might ask: For what exact purpose do you want the interchange? What is the problem you’re trying to address? Are there other options you’ve considered to deal with this issue? What is the value of the outcome of this project, compared to the potential cost (ROI)? The answers to these questions might indeed lead to a project, but more often we are able to identify alternatives that solve the problem for the community in a creative, more cost-effective way.
...WE CAN ONLY OVERCOME THOSE CHALLENGES BY ADOPTING NEW APPROACHES TO SOLVING OUR PROBLEMS...
Many of these investment decisions have a direct impact on businesses and freight movement, which makes it extraordinarily helpful to have robust, granular data to enlighten those decisions. Typically, DOTs know the volume of freight-loaded trucks traversing the state. But, it’s better to know what types of trucks they are and what products they’re carrying. It is the product that drives the decisions for transport so, the more we understand the product needs and demands the better outcome we can create for businesses. Also, if we understand how those products fit into the overall supply chain - how and when they connect with other modes, such as rail and ports - we can invest in ways that optimize the economic impact for the business, the region, the state and the nation.

Let’s Build on Our Success
It’s important that we all acknowledge the great work accomplished by the public and private sectors during the last century, which has created one of the most phenomenal transportation systems on the planet and the envy of other countries. We are exceptionally good at helping businesses move their goods around the world and at helping people arrive to their destinations safely.

Does our transportation system face real challenges relating to infrastructure condition? Yes, there is no doubt. But, we can only overcome those challenges by adopting new approaches to solving our problems, and by tapping the best ideas of our people and forge new non-traditional partnerships - as the saying goes: the first real victory of a leader is over one’s self. The best way to optimize today’s infrastructure with a focus on the future all begins with transforming our departments of transportation through a commitment to innovation and taking risk.

ABOUT THE AUTHOR
Paul Trombino has been the director of the Iowa Department of Transportation since June 2011. Before this, he served at the Wisconsin Department of Transportation for 17 years, where he was: director of the bureau of transit, local roads, rails and harbors; regional operations director of the highway division; director of the statewide structures; and manager of highway bid lettings. Before joining to WisDOT, Trombino spent four years in the finance and banking industry in Chicago and Washington, D.C.
Americans are taking advantage of public transportation options like never before. In 2015, people took 10.6 billion trips using public transit systems - whether by rail, bus, ferry or other modes of travel. In fact, over the past 20 years, U.S. public ridership has risen 39 percent, far outpacing the 21 percent rise in U.S. population that occurred during the same period.

Great news for America’s transit agencies, right? Yes - but to an increasing degree we’ve become victims of our own success. Many transit agencies haven’t been able to expand capacity to keep up with this spreading demand. What’s more, several of the nation’s older, most well-used systems are under the greatest stress, beset by aging equipment and service interruptions that can challenge the best-run transit agencies.

The Federal Transit Administration’s most recent assessment of our nationwide public transportation system is sobering: more than 40 percent of America’s buses and 25 percent of our rail transit assets were in ‘marginal’ or ‘poor’ condition. This status falls well short of demonstrating a state of good repair, which is the goal of every system, large, medium and small and for both bus and rail. According to the same FTA report, the backlog in equipment replacement and deferred maintenance needs adds up to $86 billion.

Keep in mind that the $86 billion is simply what’s needed to bring existing transit assets into good repair. Now, consider that the nation would have to invest $43 billion annually to improve system performance and condition to accommodate an expected 2.4 percent annual growth in transit passenger-miles. This estimate, supported by the American Public Transportation Association and American Association of State Highway and Transportation Officials, would need to be adjusted to a higher figure if the public’s appetite for transit ends up exceeding this annual growth projection.

These daunting estimates no doubt informed our legislators’ actions last year as they finalized and passed the Fixing America’s Surface Transportation Act. The five-year law provides $61 billion for public transit, which represents an 18 percent increase over recent funding levels. Yet, while this funding was good news for the transit industry, it reinforced just how much is riding on our local and state leaders to champion and invest in public transportation in the years to come.

Competing for the Future
For many of America’s mayors, public transportation represents much more than a way to ensure mobility in their cities: it represents a powerful strategic advantage as they strive to attract business investment and talent, strengthen their economies, and deliver on the promise of an outstanding transportation future.
quality of life. They also understand the need to move quickly, because they are competing with cities in their own regions or elsewhere to grow and thrive.

At its most basic level, public transportation provides a number of benefits. It supports economic vitality by helping people across the social spectrum to get to work – nearly 60 percent of the trips taken are for commutes. Robust public transportation use also helps ease traffic congestion while improving air quality.

Recognizing these benefits, America’s mayors have been at the forefront of diversifying and integrating public transportation options. There are many examples of their work – and that of regional transit leaders – across the country: For instance, Los Angeles, in particular, offers an illustration of the transformative power of strategic investment in transportation.

Los Angeles is a city that for much of the last century was singularly and proudly car-centric. During the past 25 years, however, the city has built its outstanding Metro system, every few years putting new light rail or subway lines into service. Most recently, Los Angeles has been a leader in supporting complementary modes of transportation, such as ubiquitous ride-sharing and bicycle lanes that crisscross hundreds of miles across the city. The city’s leaders still have much more work to do, but they are committed to making public transportation a bigger part of their strategy for handling today’s congestion and the demands of an ever-increasing population.

**Earning Public Support**

Transformation on this scale demands investment, which is why Los Angeles is calling upon its voters to support a ballot initiative – Measure M – designed to raise the sales tax across L.A. County by a half cent, while also continuing the previously approved half-cent sales tax beyond its current mid-2039 expiration date. Resulting revenues – $120 billion – would flow to the public transportation options just discussed, as well as to highway projects and local transportation projects.

Los Angeles has plenty of company in calling upon voters to step up to meet the public transportation funding challenge. While no one can predict ballot outcomes, we do know that, since 2000, public transit ballot initiatives have passed more than 70 percent of the time. This bodes well for many communities and for the nation’s public transportation as a whole.
...IT REPRESENTS A POWERFUL STRATEGIC ADVANTAGE AS THEY STRIVE TO ATTRACT BUSINESS INVESTMENT AND TALENT...
Collaboration and Innovation
The cities and regions that have the greatest success in garnering support for public transportation improvements often start with a highly inclusive planning process. Transportation leaders go out to the community to ask about what people really want – how they envision the transportation system working for them every day. Leaders engage the business community, particularly large businesses, to understand their issues and goals for the future. Importantly, they also synthesize and share information that helps stakeholders understand what other communities have gained by investing in infrastructure - providing real numbers about jobs, economic growth, gains in property values and other metrics.

We cannot restore and expand our public transportation system without reaching outside of our conventional agency silos to achieve greater collaboration. We must view emerging concepts such as ridesharing as accelerators of positive change, not as competitors. In fact, I contend that autonomous vehicles (soon the car, and ultimately the bus and train) will be game-changers for public transportation. They will bridge the first and last mile of people’s trips, making subways, light rail and commuter rail systems – even high-speed rail – much more accessible and responsive to society's needs. In fact, a recent APTA research study found that even now the more frequently people use shared mobility services such as Lyft and Uber, the more likely they will be to use public transit.

By investing in our public transportation systems now, we'll have a stronger foundation for a more efficient, affordable and hard-working system in the future. ■

ABOUT THE AUTHOR
Richard White is acting president and CEO of the American Public Transportation Association, whose 1,500 members are public, private and government entities involved in advancing public transportation options throughout the nation. White has spent his entire career in the public transportation industry, with more than 32 years on the public sector side at the federal, state and regional levels and more than 16 years with executive management responsibilities at multimodal transit agencies.