WE ALL FALL DOWN

The deadly consequences of our failing infrastructure

BY BARRY B. LEPATNER

The U.S. has always been a nation that builds great things. The Erie Canal, the Transcontinental railroad and the Interstate Highway System are just a few. Americans know how to build boldly and build well, but we don't do a good job of maintaining what we build. This unfortunate truth reduces our safety, security and economic strength to a competition between hope and gravity. That's one contest where gravity always wins.

How many bridges or overpasses do you cross on your way to and from work each day? How many do your children cross to and from daycare or school? If you haven't stopped to consider the safety of the roads and bridges you use every day, you aren't alone. Many Americans take the infrastructure that keeps the United States running for granted.

Consider New York's Tappan Zee Bridge, which transports 51 million vehicles a year. It is rated both structurally deficient and fracture critical, meaning the failure of just one element of the bridge could cause the collapse of the entire structure. Or Minneapolis's I-35W bridge, a fracture critical structure which was rated "poor" before it collapsed during rush hour in 2007, killing 13 people and injuring 145. The reality is that our nation's infrastructure is in dire need of repair.

The American Society of Civil Engineers' 2009 Report Card for America's Infrastructure concluded that the overall condition of our infrastructure—including its dams, wastewater treatment plants, power grid, roads and bridges—merits a grade "D." The U.S. transportation system includes more than 600,000 bridges, of which nearly a quarter are

The Minneapolis' I-35W bridge was deemed fracture critical before collapsing in 2007.

deemed to be either structurally deficient or functionally obsolete, equivalent to a rating of "poor" and unable to withstand their original design standards.

Today, the average bridge in the United States is more than 50 years old even though most were only designed for a 50-year life span. But because states have been using transportation funding for new projects instead of maintenance, or have simply frozen infrastructure spending altogether, the traveling public is traversing tens of thousands of bridges that do not meet acceptable standards of safety, and more importantly, will not receive the repairs they need any time soon.

The risks to those traveling these deficient bridges are not just limited to personal danger. Infrastructure failure would jeopardize our entire commercial sector, as well as our national security network. Moving freight across the U.S. is one of the most critical financial factors affecting our economy. However, massive congestion, estimated to cost nearly $200 billion a year in lost productivity and gas, threatens to choke off our ability to get goods to our

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rail centers and ports. As a result, we continue to fall further behind our major international competitors for global commerce. While infrastructure investment in China is running at nine percent of that nation's GDP and in Western Europe it is five percent of GDP, in the U.S. we are only spending two percent. We can no longer avoid addressing this problem. We are running out of time.

Correcting the nation's widespread infrastructure problems while continuing to meet the needs of a growing population– one that is projected to grow by 100 million people by 2040– will take an enormous national commitment. It's a dilemma that can no longer be waylaid by ineffective governments. It can no longer be postponed using the slow economy as an excuse. In fact, it's a problem that, once it's finally addressed, will provide a huge boost to the economy via its huge potential for job creation.

For the nation to do better and become truly smarter about the way it maintains and protects its critical infrastructure system, significant changes are needed. I propose the following key solutions:

Create jobs by repairing the nearly 8,000 U.S. bridges in danger of collapse. According to the Federal Highway Administration, we have 7,980 bridges in the U.S. that are both structurally deficient and fracture critical. This means they all are in potential danger of collapsing just like the I-35W bridge in Minneapolis. And all it takes is the structural failure of just one piece for them to collapse in much the same way.

Now consider this: estimates from studies show that every $1 billion of infrastructure investment creates 10,000 to 31,000 jobs. It's projected that each of these bridges can be fixed for an average of $20 million. With an investment of $40 billion, for example, we can create as many as 400,000 jobs that will last for at least two years and will help avoid future catastrophes. One-third of this expenditure (in this case, $13 billion), would be immediately returned to the federal and state governments via income taxes. The balance would be rotated through the economy as workers spend on food, housing, clothing and other consumer goods. The net cost to the deficit will be zero.

Raise the gas tax and reform it to be based on miles traveled. The gas tax hasn't been increased in almost 20 years, while during that same time, we've added more than 100,000 miles

of roads. Many of these new roads have merely added to congestion as the maintenance of other highways, byways and bridges went unaddressed. With an increase in the gas tax, the Highway Trust Fund will get a new breath of life, and we can begin to address these snowballing maintenance issues.

The current federal gas tax is based on usage that is measured by the gallon instead of on the amount of miles driven. The introduction of more fuel efficient cars, albeit a good thing, means many drivers are paying less than their fair share for highway maintenance. We need to use the latest technology to more evenly allocate a highway use tax that places more of the burden on those who are the heaviest users. One solution that the Congressional Budget Office recently called a "practical option" would be to tax drivers based on vehicle miles traveled rather than on the amount of gas they use.

Improve funding oversight. The current system for overseeing the distribution of federal aid for state highway projects through the Federal Highway Administration is clearly broken. After funds are distributed to the states, it is hard to determine where the money goes from there.

Since its inception, money collected as part of the federal gas tax has been used to build and repair the nation's roadways. Over the years, though, state and federal officials have started reaching into that pot to fund other less-critical transportation projects not connected to roadways. Too often politicians use infrastructure funds on new projects that will help them get re-elected rather than on their state infrastructure's much-needed maintenance and repairs.

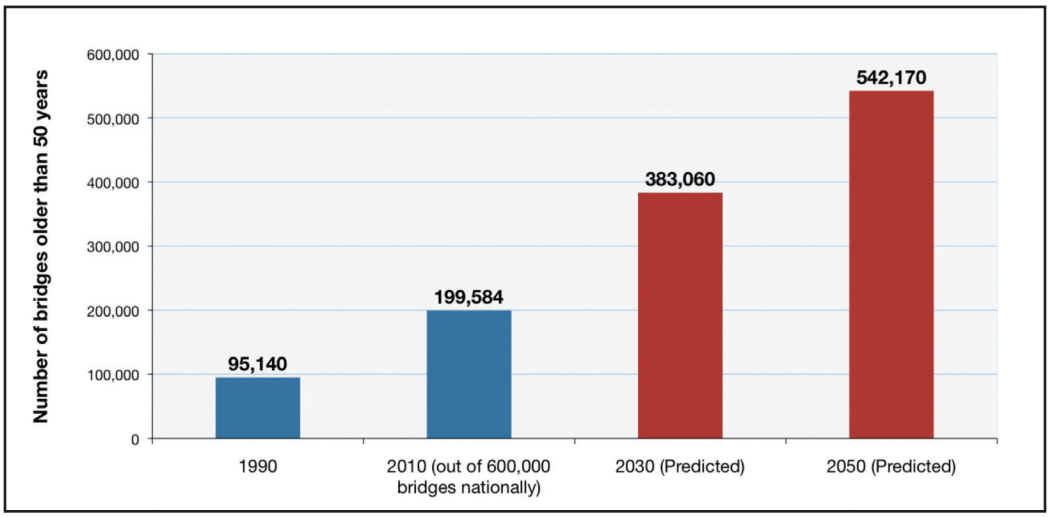
Consider the adverse reality of the Minnesota Department of Transportation's (MNDOT) decision not to fund the replacement of the I-35W Bridge. Immediately following its collapse, the federal government allocated $275 million for a state-of-the-art replacement bridge. Yet, prior to the original bridge's collapse, MNDOT chose not to make state-funded repairs that could have saved lives, and prevented the human injury and economic consequences that resulted from the collapse. Today, transportation agencies lack the resources to bring our aging infrastructure up to acceptable standards. Requests to politicians go unheeded, as these agencies lack any political clout with politicians who prefer spending on new roads, tunnels, bridges and high-speed rail lines that reward campaign contributors.

According to the American Society of Civil Engineers, the amount of money needed to fix and sustain our nation's infrastructure exceeds $2 trillion. Finding the money will require the federal government to play an active role. It will require that infrastructure funds collected be used for their intended purpose. It will entail the development of new, creative relationships between the public and private sectors. It will require a renewed sense of urgency on the part of politicians. And it will involve an extensive re-education of our leaders and the public on how to develop the regional transportation planning needed for the future growth of our nation.

Use only true fixed-price contracts on infrastructure projects. Outrageous cost overruns of 20 to 40 percent or more (like on the Big Dig, Miami Airport and Ground Zero) can no longer be accepted. It is time for a major overhaul of the method

This steel truss bridge, one of the oldest types constructed, was labeled fracture critical like the I-35 bridge, which means if a single tension member fails, the bridge falls.

by which the federal and state governments bid out construction projects. Requiring contractors to bid with true fixed-price contracts and assume the risk of completing on time and on budget can be incentivized through agreements that pay bonuses for early completion. In addition, better cost analyses by governments and risk management that prices contingencies will end the spiral of cost overruns and save governments billions of dollars annually.



According to Transportation for America, a coalition focused on transportation reform, most U.S. bridges were engineered with a 50-year design life, and roughly one-third of them are already that age or older.

Increase the use of Public/Private Partnerships (P3s). It is time to actively incentivize private investors to assist in strengthening our failing infrastructure. For years, these P3 investments have been improving infrastructure all across the globe. As federal and state budgets are inadequate for the enormous tasks at hand, we will need to reach out to private sources for financial assistance. If our nation can develop a valid and balanced mechanism for implementing P3s, we will increase our ability to tap into the nearly $200 billion in private capital available. It is time we take advantage of the private sector's willingness to take on risk for a fair profit while protecting the public's interest. We can ensure new and needed infrastructure while reaping the long-term benefits of low interest payouts to private funds that are ready, willing, and able to support this critical area of need.

Institute the proposed National Infrastructure Bank. Proposals for a National Infrastructure Bank have been around since the idea was originally put forth by U.S. Senators Chris Dodd and Chuck Hagel in 2007. Earlier this year it was renewed when Democratic Senators John Kerry and Mark Warner and Republican Senator Kay Bailey Hutchison offered bipartisan legislation that would create a national infrastructure bank. They propose that the federal government make an initial deposit of $10 billion into the bank, after which the bank would become independent and self-sustaining, and the full value of each invested dollar of seed money would be returned to the federal government with interest.

As put forth on the website Infrastructurist.com, "Projects can receive up to 50 percent of their financing from the federal money, but the rest (ideally much more than half) will have to come through private investments. If all goes according to plan, the authority can expect to leverage hundreds of billions in private infrastructure funding over the next several years…The key to the authority's success would be its ability to attract private investors. Initial reports suggest the government's $10 billion seed money could grow to $640 billion inside ten years."

Increase the use of available technology. For a country generally smitten with technology, it is ironic that when it comes to maintaining our nation's costly infrastructure, technology is noticeably absent. Using appropriate technology will produce enough savings to offset the staggering costs resulting from the past few decades of deferred maintenance. New assessment technologies that exist today are central to overcoming the limiting effects of visual inspection for both bridge management and funding allocation, while offering a variety of benefits to transportation departments and the public.

Technology currently exists that can anticipate bridge remediation years before structural rust, corrosion and cracks appear. The federal government needs to provide states with funds to purchase this equipment and train their inspectors to use it. Enabling bridge inspectors to ensure precision and objectivity in their evaluation process will in turn allow us to catch problems earlier when they are less costly to fix and can save state governments countless millions of dollars a year in unnecessary remediation.

Create a national clearinghouse for bridge information. Through the Federal Aviation Administration, the airline industry has alerts that immediately advise all airlines of problems with a defective aircraft that require immediate attention before similar planes can go back into service. A similar database should be created to require the FHWA and the National Transportation Safety Board (NTSB) to alert all state transportation departments of any bridge failure with the correlative obligation to take immediate steps to remediate all affected bridges in their jurisdictions.

Here's how the system would work: A national alert would go out immediately after a bridge failure, urging transportation agencies to inspect all similarly designed or constructed bridges within their purviews. Immediate warnings to close at-risk bridges would be sent from the centralized database, and information from follow-up investigations to ensure compliance and corrective work would be gathered and recorded there. All of this would be publicly available

information to assure local communities that transportation funding was going where most needed in any state.

Creating a national clearinghouse for the collection and widespread dissemination of information to transportation agencies about the different types, conditions, remedial alternatives and inspections relevant to the vast number of bridges in our nation's infrastructure is long overdue.

Implement a new rating system for our nation's bridges. The current rating system used to categorize the condition of the 600,000 bridges in the National Bridge Inventory does not provide the information that transportation authorities need to accurately allocate remediation funds. Federal ratings, which utilize a scale of 1 to 9 (9 being best), result from overall average condition assessments of a bridge's three or four major components.

According to the FHWA, a bridge is considered "structurally deficient" if the condition rating of one of its major components is less than a 5, the bridge has inadequate load capacity or its repeated flooding is causing traffic delays. According to this rating system, the fact that a bridge is structurally deficient does not necessarily imply that it is unsafe or likely to collapse. However, as with the I-35W bridge, which was rated structurally deficient, the rating is a warning sign and a starting point for closer examination to determine if a bridge is safe for the traveling public.

A new set of standards for bridge inspections, as well as new requirements for inspectors' hands-on experience, needs to be created. The FHWA should prepare formal programs to be presented to all transportation agency personnel nationwide that include visual presentations of precisely what inspectors should observe under situations ranging from the earliest detection of signs of wear and tear to the appearance of conditions that require a structurally deficient bridge to be reclassified as unsafe. Senior officials in state transportation agencies—even those who are not licensed engineers—should be required to attend these sessions and join their staffs on inspections to become personally acquainted with various bridge conditions, in an effort to improve their agencies' ratings of those bridge conditions.

Restore the engineering profession to its traditional role. In no small part, the inability of our nation's engineers to play a larger role in transportation infrastructure policy has been a major reason for the profession's decline and the concomitant decline of our infrastructure in recent decades.

Restoring the engineers in our transportation system to positions where they can exercise their professional judgment free of political or financial constraints is a critical step toward ensuring that work on our most deteriorated roads and bridges is performed according to their needs, rather than treating all infrastructure equally. Increasingly, the engineers in state transportation departments are being marginalized, moved further from the public eye, and replaced by budget specialists or political appointees with no engineering backgrounds. The judgment and experience of our engineering professionals must be allowed to come to the fore, as our aging roads and bridges reach an even more critical state in the years ahead.

The inadequate amount of funding for remediation is, and will be for the near future, an important element in how we address this serious problem. But financial concerns should not outweigh the professional judgments of the engineers who are the true stewards of our transportation system, and who are charged with protecting the welfare of the traveling public. We must again learn to trust in their judgment and experience, and not let their recommendations be compromised by budgetary constraints.

The risks of continuing to ignore our ill-maintained national infrastructure are almost unimaginable. Our nation's leaders can no longer neglect to take control of this dire situation, as it threatens the everyday safety of the public and national security and which will no doubt further deteriorate an already slow economy.

I do not know if our current leaders have the wisdom to see these problems through to the right conclusion. But I do know that, when it comes to the perilous state of our infrastructure, failure is not an option.

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