

Research Note

Paying for a Rundown U.S. Surface Transportation System

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Abstract: The U.S. transportation systems sector has an incredibly huge financial issue at hand. Congress does not have a plan for how to pay for damaged or dilapidated roads, highways, bridges, and tunnels. The fund to pay for these segments of the surface transportation system is already in the red. Within the next 18 years, it is likely going to be severely underfunded, even more so than now. This paper will focus on the risks associated with the U.S. surface transportation system, and financing its improvement within the public and private realms.

The U.S. Department of Transportation (DOT) and the Department of Homeland Security (DHS) are responsible for the Transportation Systems sector, which works to move goods and people within the country and overseas securely, carefully, and swiftly.¹ This sector is made up of seven important modules, or subsectors: 1) Freight Rail, 2) Passenger Rail and Mass Transit, 3) Aviation, 4) Postal and Shipping, 5) Pipeline Systems, 6) Maritime Transportation System, and 7) Motor Carrier and Highway. The Motor Carrier and Highway mode incorporates over four million miles of road, more than 350 tunnels, and over 600,000 of bridges.²

Relatedly, the U.S.'s infrastructure composes of sea and airports, mass transit systems, bridges, water infrastructure, roads, highways, and tunnels.³ As the U.S. Chamber of Commerce (COC) has recognized, this infrastructure are vital assets to the nation that propel safety, jobs, worldwide competitiveness, and growth.⁴ Nevertheless, the Chamber reports that the U.S. has not been able to agree about how to finance for incredibly necessary repairs and maintenance.⁵ Therefore, this issue raises not only concerns of the costs to U.S. citizens, but also the implications to their personal safety and U.S. national security.

The U.S. Government Accountability Office (GAO) has identified the funding of the country's surface transportation system as a high-risk area.⁶ The GAO stated that addressing the issue is a

matter that primarily entails an act of Congress; and thusly, is an operational risk attributed to people. A major source of money for the U.S. surface transportation system is from the Highway Trust Fund; however, that support has been dwindling. The provisions for that fund come from various truck-affiliated and motor fuel taxes. Since federal taxes on motor fuel have not risen since 1993, inflation has created a downward trend in the trust funds value. Given the outlook for vehicles and fuel usage, they have concluded that the downhill trend is likely to endure as the desire for gasoline goes down along with the institution of alternative fuel and more fuel-efficient automobiles. The highway trust fund balance for 2015 was projected to be negative \$2 billion, and it is expected that it will be negative \$157 billion by 2024.⁷ So, money to help finance the U.S.'s surface transportation system will need to be increased towards the trust fund, or the country will need to find money elsewhere.

The reason that the U.S.'s surface transportation system is at such a high risk is because lack of funds means that new roads, bridges, and tunnels cannot be developed, nor can there be repairs or maintenance to them. The surface system is crucial to the nation's economy and affects most American's lives daily, as it moves both freight and people.⁸ So, having a corroding transportation surface system means that repairs, maintenance, or new developments will not only be expensive, but with a potential extra cost coming from prolonged wear and tear or increased risk of catastrophic events that could take the lives of many people, or damage or destroy current subpar transportation surfaces. As the system is currently under mounting stress, the price to upgrade or repair the system, for now and the future, is assessed to cost hundreds of billions.⁹

Not only are the sources of funding worsening, but also the financing is additionally problematic due to the economic condition and financial outlook of the federal government. The U.S. cannot substitute committed federal revenue, such as with clever financing methods or loan programs, for federal transpiration.¹⁰ So, for an upturn in the U.S.'s highway network, dependable sources of revenue need to be found. Now, to better understand the challenge to the U.S.'s surface transportation system, we can explore the issues and risks associated with it in its public and private spaces.

U.S. News and World Report noted that the American Society of Civil Engineers (ASCE) just recently graded the U.S. with a D+ for infrastructure, which includes roadways and highways.¹¹ The group stated that the rundown roadways and highways had "a pressing need for modernization."¹² They also determined that a portion of the \$3.6 trillion needed for infrastructure will need to be distributed to those dilapidated roadways, just to elevate it to a satisfactory level by 2020. As for those roadways and highways, the ASCE gave them D rating.¹³

Furthermore, the ASCE mentioned that 42 percent of the U.S.'s main urban highways continue to stay jammed, which costs the economy approximately \$101 billion in fuel and wasted time each year.¹⁴ Additionally – and in spite of improved circumstances in the immediate period – local, state, and federal capital investments for road work have moved up to \$91 billion annually; and yet, that level of financing has been inadequate.¹⁵ That funding is still anticipated to lead to a

drop in performance and conditions for the long run. As of now, the Federal Highway Administration projected that \$170 billion of capital investment will be needed yearly to create a substantial improvement to performance and conditions of the highways and roads.¹⁶

The ASCE found that the country's roads could gain an assistance from substantial performance enhancements without having to add new highway lanes.¹⁷ In addition, unfavorable community influences – such as highway infrastructure that has a high price by adding capacity, problems in gaining necessary right of way, and induced sprawl – suggest that all efforts need to look towards improving current roadway network management. States and cities around the U.S. are raising the use of technology to increase efficient signal timing, enhance the flow of traffic and variable speed limits, and decrease congestion. A heightened practice of telecommuting, in addition to available and convenient alternative methods of transportation, are a few instances of how added enhancement can be better overseen and how the demand for capacity rises.¹⁸

Also, safety remains to be a significant emphasis for investment as numbers allude that road and highway conditions result in about one-third of the U.S.'s entire traffic fatalities.¹⁹ On a positive note, road fatalities have dropped annually, equating just under 33,000 deaths in 2010, or a decline of around 24 percent since 2005. On the other hand, these collisions amounted to \$230 billion yearly on the country's economy. The ASCE suggests improving or installing median barrier mechanisms, broadening shoulders and lanes, and decreasing exposure to obstacles offer chances to bring down collisions, deaths, and injuries.²⁰

Along with roads and highways, a significant amount of risk comes from dilapidated bridges. The current state of many of these can be attributed to risk from people, systems, and external factors. As for failing bridges, Congress, and state and local governments have showed little to no significant progress towards addressing them. To state the criticality of the situation, a 2015 article by U.S. News and World Report indicated that the more time that it takes to deal with bridge needs, the costlier it will become - it can cost three to four times as much to repair a bridge with advanced degeneration than one that is moderately requires repair.²¹ For example, the state of Rhode Island was obligated to pay \$167 million for an entire bridge replacement since it was unsuccessful at preserving the original.²²

A Harvard Business School article reports that 24.3 percent of the nation's bridges – 64,000 in total – had been recognized as “structurally deficient or functionally obsolete,”²³ and the ASCE has put it that one-ninth of the country's bridges are as structurally inadequate, where the average age is 42 years for the country's 607,380 bridges.²⁴ They also have it that of the U.S.'s 102 biggest metropolitan areas, deficient bridges are logging more than 200 million trips daily by vehicles. Right now, only \$12.8 billion is sent on the nation's backlog of bridge deficiency; although, it would cost \$20.5 billion yearly to get rid of the insufficiency by 2028, the Federal Highway Administration approximated. The ASCE said that the problem for local, state, and federal governments is that they need to add \$8 billion each year to bridge investments so they can deal with the \$76 billion needed for insufficient bridges throughout the U.S.²⁵

Along with the trouble to pay for roadways, highways, and bridges, there is also a definite

challenge to pay for broken-down or new tunnels. Conversely, a positive light has shined on the U.S.'s ability to utilize tunneling technologies in the face of the money crunch. Nevertheless, many metropolitan areas are addressing their growth issue by using the latest advances in tunneling.²⁶ So, to deal with unrelenting growth, urban areas are extending underneath their cities at an extraordinary pace. However, the drive to expand underground is not only a growth concern from above, but also because of the remarkable advances in tunneling. Recent decades have seen engineers advance automated and mechanized systems to crunch through deep muck and rock, while preventing collapse and without bothering the city above. Instead of masses of men to work on these, robotic worms – or TBMs (tunnel-boring machines) – have helped to create tunnels on budget and on time. The use of these TBMs can come with applied chemistry to get through terrain that is incredibly hard or consists loose materials, along with electronic monitors and precision guidance. Thus, allowing people to burrow through underground areas that was once considered impenetrable. Bottom line, these advancements in materials, analytical tools, and technologies have enabled tunnel design for unfavorable conditions.²⁷

Yet, in spite of the remarkable accomplishments from tunneling developments, it does deliver some risks. Operational risks to create these paths can be from people, systems, and external sources. For example, the people who operate these machines need to be cognizant and skilled to operate the behemoth-sized excavators. Operational mishaps while using these machines can be quite costly to the machines if damaged, and dangerous or deadly due from concerns of collapse. Also, the various materials in the ground can create adverse digging scenarios, therefore disrupting the process. In addition, there can be issues that the TBMs that may be faulty. Notably, these concerns are quite relevant with Seattle's own venture to create a tunnel. The city's TBM, or "Bertha" as it is known, sat inactive for two years until December 2015, as the machine underwent repairs after it unexpectedly struck metal piping near the beginning of the excavation.²⁸ The setback was costly, in terms of money and time.

Not at the size of public roadways, private roads are another element within the U.S.'s immense surface transportation infrastructure. Where the private sector takes a stake at the nation's roadways, the public sector can step aside under certain circumstances.²⁹ One way that private roads can take the place of public ones is when they have established that they are a reasonable advantage against government agencies.³⁰ Another way is that private roads must be defined well, with unambiguous criteria for determining failure and success. Thirdly, the performance of private contractors must be grounded by constant competition, so that multiple contractors can bid to help control costs and that substandard performers can be promptly. Lastly, private road development is optimal when there is accountability of the government officials who make the decision to privatize.³¹

Therefore, while those conditions are satisfied and development of these roads are practical, these benchmarks are also applicable to the privatization of bridges and tunnels. However, there are some identified risk concerns from privatization of these surface transportation realms. One issue is that – even though privatization may propose relief transpiration budget troubles in the short-term – the public will not receive the entire benefit for toll revenues in the future. The

reasoning for this is that private investors will payoff their deals early, thus not provide states the estimated revenues that were calculated in the initial deals. Secondly, the public loses jurisdiction on transportation policy, thus can lead to extra cost where the private operators can request compensation for dealing with transportation issues. Finally, there is no ensuring from public officials that private contracts will be reasonable and effective.³²

A multitude of risks can be identified as one looks at Washington State's HIVA which can also be applied to many other roads, highway, bridges, and tunnels throughout the U.S.³³ Near the upper elevations or during the winter seasons, natural hazards can adversely affect these surface transportation elements (roadways, bridges, and tunnels) by avalanches, landslides, and volcanic eruptions. A mudslide – similar or worse to the one in Oso, Washington in 2014 – can cause tremendous damage to those elements as well as loss of life. Earthquakes, floods, and tsunamis can severely damage or completely destroy these transportation elements, or inundate them with water to damage them or make access to these roads impossible.

Technological hazards, identified in the same HIVA above, can adversely affect roads, bridges, and tunnels, as well. Chemical, hazardous material, radiologic, dam failure, exploding pipeline, urban fire, and local hazard events can affect transportation surfaces by damaging their strength or structural integrity, or making them inaccessible. Civil disturbances, such as criminal activities, or terrorism/cyber-terrorism can wreak havoc on these transportation elements causing massive disruption, damage, injury, or loss of life. Lastly, transportation itself can be seen as a risk because faulty or damaged roads, highways, bridges, or tunnels can create massive financial losses to vehicles, injuries, or deaths.

In order to address the incredibly-steep and uphill trek to pay for transportation surface needs, those within the U.S. may need to dig deep within their own pockets in order to finance that shared – and necessary – component of U.S. infrastructure. As mentioned earlier, the GAO determined that the nation has failed to find common ground about how to pay for required repairs and maintenance. The Highway Trust Fund is eroding and does not appear to be gaining any financial support. This is stacked on top of the current trend of drivers who want more efficiently running vehicles that use less fuel. Without more money coming in via fuel or trucking-affiliated taxes, that single trust fund is merely an empty tank that is growing immensely. It appears that the country cannot continue to substitute already-committed federal revenue, nor use clever financial methods or loan programs. Yet, money still needs to come in to pay for it, somehow.

It has been stated by many, that Congress needs to step up and push for higher taxes, and agree on long-term plan for funding surface transportation work. However, this may be political suicide. Nevertheless, it seems that they will need to make that decision in order to get money for the needed repairs and maintenance. So, how can they do that?

In order for Congress to get a bill passed for more money to transportation surfaces, there needs to be grass roots efforts to rally support for higher taxes. This idea may sound incredibly unpalatable, but what other choice does the U.S. have? There needs to be a push for

understanding that the roads are used by its citizens and must be maintained by them. Who else is going to pay for the huge bill? Privatization? The risks involved with having private operators can create setbacks towards surface transportation. Nonetheless, they can still be involved with the efforts, if the private operators and government can both perform their due diligence, so that there is a mutual agreement and neither side takes advantage of the other.

Furthermore, before Congress can get the support needed, they should consider reexamining their current programs in place. In addition, Congress should implement performance-based approaches to measure surface transportation program effectiveness. If Congress can get the support for higher taxes, they should continue with program reexamination and utilizing performance-based approaches. In addition, governments at all levels should strongly consider the “fix it first” philosophy. The attention that politicians and the media can receive from new – and more attractive – surface projects generally mean that these cost for these are more than repairing or maintaining them.³⁴ They should look to fix these surface elements before deciding that it is better to build. If they do choose to build, Congress should also look into using effective technologies and materials to keep develop cost to a reasonable minimum.

To conclude, many roads, highways, bridges, and tunnels are in dire need of repair, replacement, or development. To help keep the U.S. optimally functional, Congress needs to find a long-term plan for investing in the U.S. surface transportation system. Clever financing, loans, and bipartisan squabbling will not help to solve the problem. The U.S. Chamber of Commerce may have said it best that “It’s time to stop thinking about infrastructure as a problem, but as an opportunity for bipartisan agreement to invest wisely and carefully in our most critical needs, while eliminating wasteful spending.”³⁵ What is more, and aside from loss of property, at what human cost is this going to have, if we do not address this issue? How much loss of reputation, and how much injury or loss of life is it going to take before any action takes place? Thusly, Congress will need to raise taxes, but it must first rally support for that from its citizens, and create a well-developed and long-term plan. Thus, the people of the nation will need to swallow a huge and bitter pill to remedy ailments of a system that they so critically need.

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² Ibid.

³ “Infrastructure.” U.S. Chamber of Commerce. 2016. Accessed May 28, 2016. <www.uschamber.com>.

⁴ Ibid.

⁵ Ibid.

⁶ “Funding the Nation's Surface Transportation System.” U.S. Government Accountability Office. 2015. Accessed May 28, 2016 <www.gao.gov>.

⁷ Ibid.

⁸ Ibid.

⁹ Ibid.

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¹⁹ Ibid.

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²⁹ Baxandall, Phineas. "Private Roads, Public Costs". *U.S. PIRG Education Fund*. 2009. 4. Accessed May 31, 2016 <www.uspirg.org>.

³⁰ Ibid.

³¹ Ibid.

³² Ibid.

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