FUNDING AMERICA'S TRANSPORTATION SYSTEM

A National Transportation Research Nonprofit

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Founded in 1971, TRIP ® of Washington, DC, is a nonprofit organization that researches, evaluates and distributes economic and technical data on surface transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway and transit engineering and construction; labor unions; and organizations concerned with efficient and safe surface transportation.

The safety, condition and efficiency of the U.S. transportation system serves as the backbone of our economy and social networks and is pivotal to quality of life, allowing for access to jobs, education, recreation, healthcare and social functions. As the nation continues to recover from the COVID-19 pandemic, the reliability, safety and condition of its roads, highways, bridges and transit systems will play a critical role in Americans' quality of life. Ensuring that Americans benefit from a full economic and social recovery from the pandemic will require that the nation is served by a transportation system that is efficient, safe and well-maintained.

This report will examine how the following factors impact the condition, reliability, efficiency and safety of the nation's transportation system.

- Transportation funding made available by the Infrastructure Investment and Jobs Act (IIJA), which is providing a needed boost in highway and transit investment.
- The role of the federal Highway Trust Fund (HTF), which collects and distributes IIJA funding, based largely on a reliable stream of highway user fees.
- The condition, performance and funding needs of the nation's roads, highways, bridges and transit systems.

INFRASTRUCTURE INVESTMENT AND JOBS ACT

Signed into law in November 2021, the bipartisan Infrastructure Investment and Jobs Act (IIJA) will provide a significant boost in federal investment in roads, bridges and transit and offers an opportunity for the nation to make progress in improving the safety, reliability and condition of America's transportation system. The IIJA will provide $454 billion over the five-year period from 2022 to 2026 for investment in highways and transit, resulting in a 38 percent increase in federal investment in 2022.[1] The report's Appendix includes the total revenue each state will receive over the next five years as a result of the IIJA, and the percentage increase in 2022.

The five-year IIJA provides the greatest increase in federal highway, bridge and transit investment in more than six decades and offers the opportunity to modernize the nation's transportation system and deliver economic benefits.[2]

Additional spending provided by the IIJA for highway, bridges and transit improvements are anticipated to have a significant benefit to the economy by stimulating additional output. A 2021 macroeconomic analysis by IHS Markit of the IIJA found that the additional spending provided by the IIJA will result in an additional $488 billion of cumulative GDP by 2027 and an increase in annual employment through 2027 of approximately 200,000 per year.[3] The IHS Markit analysis also found that each $1 million in highway, bridge and transit investment supports, on average, 21 jobs per year and that investment in highways and transit results in a multiplier of 3.6 and 3.4, respectively, in combined direct, indirect and induced economic output.[4]

HIGHWAY TRUST FUND HISTORY AND MECHANISM

In 1956, the federal Highway Trust Fund (HTF) was established in tandem with the Federal-Aid Highway Act of 1956 to create a dedicated funding stream largely to finance construction of the Interstate Highway System.[5] The HTF created a pay-as-you go highway funding mechanism based on highway user fees, and it is self-financed and self-supported. The HTF receives its revenues exclusively from highway user fees – taxes on motor fuels and other specified motorist purchases- and from interest on its existing balance (owed by the federal government on money borrowed from the Trust Fund) on its existing cash balance.

Fees on highway users continue to be a critical source of funding for the preservation and improvement of the nation's Interstate Highway System, other critical roads and bridges eligible for

federal-aid, and the nation's public transit systems. The Highway Trust Fund is deficit proof, financing road, bridge and transit improvements on a pay-as-you-go basis. By law, its expenditures for road, bridge and mass transit capital improvement cannot exceed its income.

The HTF is an accounting system under the jurisdiction of the U.S. Treasury. It receives specific highway user receipts which are then earmarked for allocations based on funding levels established by the IIJA.

The federal gasoline and diesel fuel tax was set at three cents per-gallon in 1956 and was initially dedicated for highway purposes only. Today it stands at 18.4 cents per gallon for gasoline and 24.4 cents per-gallon for diesel fuel. The federal motor fuel tax for gasoline and diesel has been increased five times since 1956, with the most recent increase in 1997.[6] Gasoline and special fuel (diesel) taxes contributed $35.8 billion into the Highway Trust Fund in 2020.[7] Motor fuel taxes collected by the Highway Trust Fund accounted for 84 percent of total HTF receipts in 2020, with the additional revenue coming from taxes on large truck use and tire sales.[8] The HTF has been split into separate highway and transit accounts since 1982. The report's Appendix includes the amount of fuel tax revenue each state contributed to the HTF in 2020 and the share of total HTF receipts.

Today, the HTF is the primary source of revenue for the IIJA, with the funds being distributed to state and local governments based on categorical formulas defined by the IIJA and through grant programs.

Despite the increase in transportation funding provided by the IIJA, the nation's roads, bridges and transit systems remain significantly underfunded and will require increased investment for needed improvements and repairs.

U.S. PAVEMENT CONDITIONS

The life cycle of the nation's roads is greatly affected by the ability of state and local governments to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible. The pavement data in this report, which is for all arterial and collector roads and highways, is provided by the Federal Highway Administration (FHWA), based on data submitted annually by state departments of transportation on the condition of major state and locally maintained roads and highways. Pavement data for Interstate highways and other principal arterials is collected for all system mileage, whereas pavement data for minor arterial and all collector roads and highways is based on sampling portions of roadways as prescribed by FHWA to ensure the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.[9]

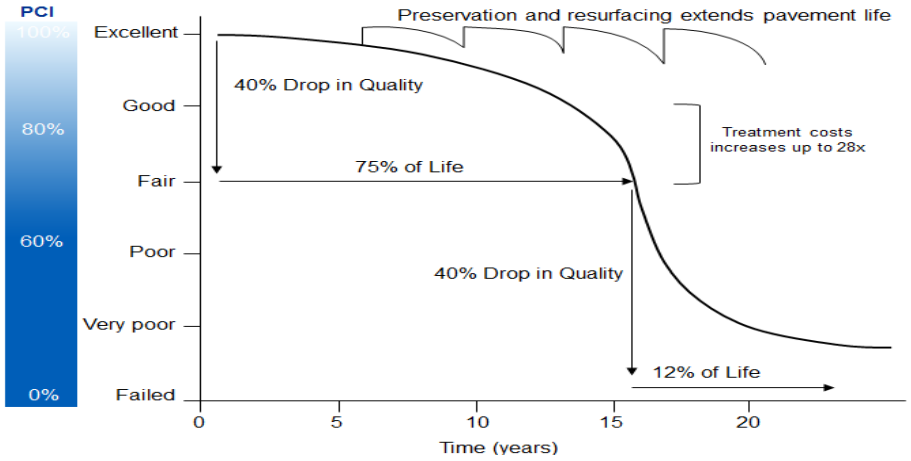
Nationwide, 40 percent of major roads are in poor or mediocre condition. Nineteen percent of U.S. major locally and state-maintained roads are in poor condition and 21 percent are in mediocre condition.[10] Seventeen percent of the nation's major roads are in fair condition and the remaining 44 percent are in good condition.[11] Pavement condition data for all 50 states can be found in the report's Appendix.

The nation's urban roads, which carry 69 percent of all vehicle travel, are even more deteriorated.[12] Thirty-two percent of U.S. major locally and state-maintained urban roads and highways have pavements rated in poor condition and 24 percent are in mediocre condition.[13] Fifteen percent of U.S. major urban roads are rated in fair condition and the remaining 29 percent are rated in good condition.[14]

Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they

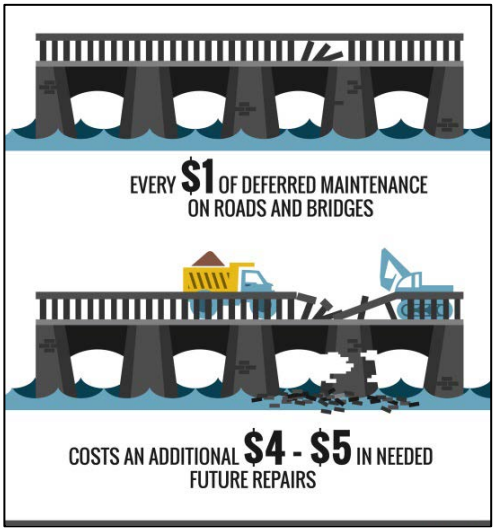
require major repairs because reconstructing roads costs approximately four times more than resurfacing them.[15] As roads and highways continue to age, they will reach a point of deterioration where routine paving and maintenance will not be adequate to keep pavement surfaces in good condition and costly reconstruction of the roadway and its underlying surfaces will become necessary.

Chart 1. Pavement Condition Cycle Time with Treatment and Cost



Source: North Carolina Department of Transportation (2016). 2016 Maintenance Operations and Performance Analysis Report.

Long-term repair costs increase significantly when road and bridge maintenance is deferred, as road and bridge deterioration accelerates later in the service life of a transportation facility and requires more costly repairs. A report on maintaining pavements found that every $1 of deferred maintenance on roads and bridges costs an additional $4 to $5 in needed future repairs.[16]



THE COST TO MOTORISTS OF ROADS IN INADEQUATE CONDITION

TRIP has calculated the additional cost to motorists of driving on roads in poor, mediocre or fair condition. When roads are in poor, mediocre or fair condition – which may include potholes, rutting or rough surfaces – the cost to operate and maintain a vehicle increases. These additional vehicle operating costs (VOC) include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional VOC borne by U.S. motorists as a result of deteriorated road conditions is $141 billion annually, an average of $621 per driver.[17]

Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more

than 100 other countries as the definitive analysis of the impact of road conditions on vehicle operating costs. The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs.[18] The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

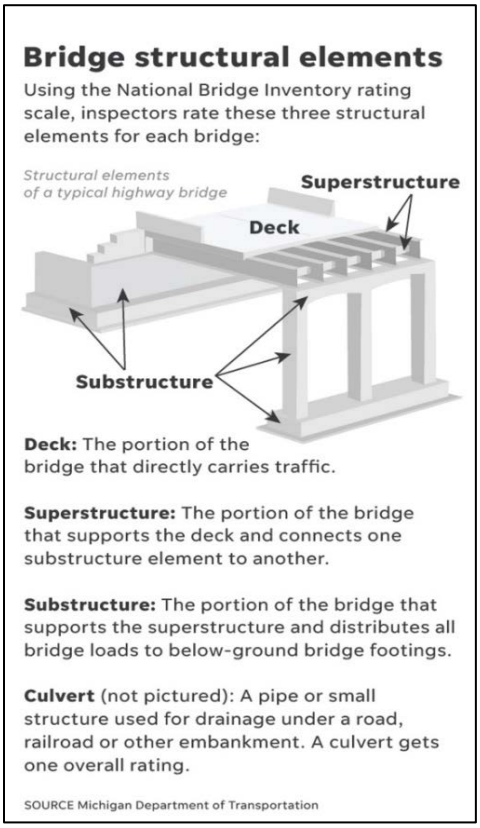
TRIP's additional VOC estimate is based on taking the average number of miles driven annually by a motorist, calculating current VOC based on AAA's driving cost estimates and then using the HDM model to estimate the additional VOC paid by drivers as a result of substandard roads.[19] Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into TRIP's vehicle operating cost methodology.

U.S. BRIDGE CONDITIONS

The nation's bridges form key links in our highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, and facilitating commerce and access for emergency vehicles.

Seven percent (43,586 of 619,622) of the nation's locally and state-maintained bridges are rated in poor/structurally deficient condition.[20] This includes all bridges that are 20 feet or more in length. A bridge is deemed structurally deficient if there is significant deterioration of the bridge deck, supports or other major components.

Bridges that are structurally deficient may be posted for lower weight limits or closed if their condition warrants such action. Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips also lengthen travel time, waste fuel and reduce the efficiency of the local economy.



Forty-eight percent of U.S. locally and state-maintained bridges have been rated in fair condition.[21] A fair rating indicates that a bridge's structural elements are sound but minor deterioration has occurred to the bridge's deck, substructure or superstructure. The remaining 45 percent are rated in good condition.[22] The share of bridges in poor condition in all 50 states can be found in the Appendix.

Most bridges are designed to last 50 years before major overhaul or replacement, although many newer bridges are being designed to last 75 years or longer. Forty percent of the nation's bridges are more than 50 years old.[23] The Appendix includes the share of bridges in each state that are more than 50 years old.

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, ensuring that a facility has good drainage and replacing deteriorating components. But most bridges will eventually require more costly reconstruction or major rehabilitation to remain operable.

U.S. TRAFFIC SAFETY AND FATALITY RATES

A total of 38,824 people were killed in traffic crashes in the U.S. in 2020.[24] From 2016 to 2020, a total of 186,074 people were killed in traffic crashes, an average of 37,215 people each year.[25]

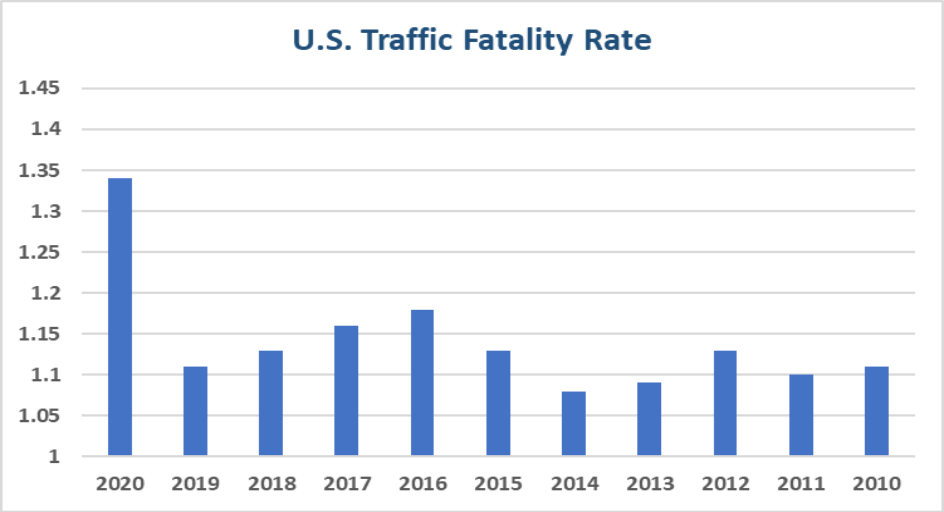
Chart 2. U.S. traffic fatalities 2016-2020.

Year	Fatalities
2016	37,461
2017	37,133
2018	36,560
2019	36,096
2020	38,824
TOTAL	**186,074**
AVERAGE	**37,215**

Source: National Highway Traffic Safety Administration.

The nation's traffic fatality rate of 1.34 fatalities per 100 million vehicle miles of travel in 2020 is significantly higher than the 2019 rate of 1.11 and is the highest fatality rate in the last 10 years.[26] The report's Appendix includes the number of fatalities and fatality rate in each state in 2020.

Chart 3. U.S. traffic fatality rate per 100 million miles of vehicle travel, 2010-2020.



Source: TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. It is estimated that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes. Roadway features that impact safety include

the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median barriers and intersection design.

Improving safety on the nation's roadways can be achieved through further improvements in vehicle safety; improvements in driver, pedestrian, and bicyclist behavior; and, a variety of improvements in roadway safety features. The severity of serious traffic crashes could be reduced through roadway improvements, where appropriate, such as converting intersections to roundabouts; removing or shielding roadside objects; the addition of left-turn lanes at intersections; the signalization of intersections; adding or improving median barriers; improved lighting; adding centerline or shoulder rumble strips; providing appropriate pedestrian and bicycle facilities, including sidewalks and bicycle lanes; providing wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; providing better road and lane markings; and updating rail crossings.

The U.S. has a $146 billion backlog in needed roadway safety improvements, according to a 2017 report from the AAA Foundation for Traffic Safety. The report found implementing these cost-effective and needed roadway safety improvements on U.S. roadways would save approximately 63,700 lives and reduce the number of serious injuries as a result of traffic crashes by approximately 350,000 over 20 years.

TRANSPORTATION SYSTEM USE, EFFICIENCY & CONGESTION

The U.S. transportation network provides mobility for the nation's more than 228 million licensed drivers.[27] From 2000 to 2019, nationwide vehicle miles of travel has increased 19 percent.[28] The report's Appendix includes the number of licensed drivers and the increase in VMT from 2000 to 2019 in each state.

Starting with initial lockdowns in March 2020, the COVID-19 pandemic has had a profound impact on the U.S. transportation system, including changes in personal and commercial mobility. These changes in transportation patterns – both during the initial response to COVID-19 and during the subsequent, ongoing efforts to minimize the spread of COVID-19 while restoring some aspects of daily life - will likely have significant implications for the nature of the country's future mobility needs and the best ways to meet those needs.

Overall vehicle miles of travel (VMT) bottomed out in April 2020 at a level 40 percent below April 2019 as a result of the various restrictions implemented due to COVID-19 and the resulting reduction in commercial and personal travel.[29] VMT has rebounded significantly since the onset of the pandemic in the U.S., with national VMT now nearing pre-pandemic levels and vehicle travel in nearly half the states now exceeding pre-pandemic levels. By December of 2021, U.S. VMT was just one percent below December 2019 levels (the most recent pre-COVID December), with 24 states exceeding VMT levels of December 2019.[30] The report's Appendix includes the rate of VMT change in each state from December 2019 to December 2021.

Increasing levels of traffic congestion cause significant delays in on the nation's transportation network, particularly in its larger urban areas, choking commuting and commerce. Forty-two percent of the nation's Interstates, freeways and expressways experience congestion during peak travel times.[31] Traffic congestion robs commuters of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to the consumer. Increased levels of congestion can also reduce the attractiveness of a location to a business when considering expansion or where to locate a new facility. The report's Appendix includes the share of Interstates, freeways and expressways in each state that are considered congested during peak travel times.

U.S. TRANSIT SYSTEM CONDITIONS

The nation's 2,250 transit systems provide access to Americans to employment, education, health care, shopping, recreation and social activities. According to the Status of the Nation's Highways, Bridges and Transit: Conditions and Performance Report to Congress released by the United States Department of Transportation in 2021, the current backlog of needed improvement to U.S. transit systems, including vehicles and facilities is approximately $100 billion.[32]

In 2020, 20 percent of transit vehicles, including buses, rail cars and demand response vehicles, had met or exceeded their useful service life.[33]

U.S. FREIGHT TRANSPORTATION

Today's culture of business demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. Global communications and the impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement, making the quality of a region's transportation system a key component in a business's ability to compete locally, nationally and internationally.

Annually, 19.7 billion tons of freight, valued at $18.9 trillion dollars, are shipped to and from sites in the U.S. The majority of freight shipped in the U.S. are transported by trucks, which carry 72 percent of freight by value and 64 percent by weight annually.[34] An additional 14 percent by value and three percent by weight are shipped annually by multiple modes, which includes trucks.[35] The report's Appendix includes the amount of freight moved to and from each state by value and the share of freight moved by trucks and other modes, which includes trucks.

Traffic congestion can increase the cost of goods and services as a result of increased delays. The Texas Transportation Institute in its 2021 Urban Mobility Report estimated that increasing traffic congestion resulted in a 77 percent increase in traffic delays for commercial trucks from 2000 to 2019, increasing from 219 million hours to 387 million hours.[36]

NATION'S TRANSPORTATION FUNDING BACKLOG

Improving the condition and performance of the nation's network of roads, highways, bridges and transit systems will require a significant increase in investment. According to the Status of the Nation's Highways, Bridges and Transit: Conditions and Performance Report to Congress released by the United States Department of Transportation in 2021, the U.S. would need to increase annual road, highway and bridge investment by 55 percent to make significant improvements in road and bridge conditions, reduce traffic congestion and improve traffic safety.[37] The report also found that the U.S. would need to increase annual transit investment by 31 percent to make significant improvements in the condition of transit vehicles and facilities and to increase ridership.[38]

ENDNOTES

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