

FUTURE MOBILITY IN PENNSYLVANIA

The Condition, Use and Funding of Pennsylvania's Roads,
Bridges and Transit System

November 2010

Prepared by:

TRIP

1726 M Street, NW, Suite 401

Washington, D.C. 20036

202-466-6706 (voice)

202-785-4722 (fax)

www.tripnet.org

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, construction and finance; labor unions; and organizations concerned with an efficient and safe surface transportation network

Executive Summary

Pennsylvania's extensive system of roads, highways, bridges and public transit is the backbone that supports the state's economy. Pennsylvania's surface transportation system needs to provide safe and efficient commutes to work and school, visits with family and friends, and trips to tourist and recreation attractions while simultaneously providing businesses with reliable access for customers, suppliers and employees. With an unemployment rate of nine percent and with the state's population continuing to grow, Pennsylvania must improve its system of roads, highways, bridges and public transit to foster economic growth and ensure the safe, reliable mobility needed to improve the quality of life for all Pennsylvanians.

As Pennsylvania looks to rebound from the current economic downturn, the state will need to enhance its surface transportation system by improving its physical condition and enhancing the system's ability to provide efficient and reliable mobility for residents, visitors and businesses. Making needed improvements to Pennsylvania's roads, highways, bridges and transit could provide a significant boost to the state's economy by creating jobs and stimulating long-term economic growth as a result of enhanced mobility and access.

Pennsylvania faces enormous challenges in addressing its transportation needs. Deteriorated road and bridge conditions and mounting traffic congestion threaten to impede economic activity and diminish quality of life. The state's public transportation systems are also in disrepair and must be modernized and expanded.

While the needs of the state's highway and transit systems continue to grow, the amount of revenue to address these needs is expected to remain inadequate, resulting in significant challenges in providing a smooth, efficient and well-maintained system of roads, bridges and transit. A recent report from the Pennsylvania State Transportation Advisory Committee shows that the state faces an annual transportation funding shortfall of \$3.5 billion to meet highway, bridge and transit needs. As the state lacks adequate funding to improve physical conditions and traffic congestion worsens, meeting Pennsylvania's need to modernize and maintain its system of

roads, bridges and public transit will require a significant boost in local, state and federal funding.

One aim of the American Recovery and Reinvestment Act, approved in February 2009, is to stimulate the economy and provide a significant, short-term boost in transportation funding. Pennsylvania’s estimated \$1.37 billion in stimulus funding has allowed the state to perform some needed rehabilitation and improvements to its road, bridge and public transit systems, but this one-time funding boost will not allow the state to proceed with numerous projects needed to modernize its surface transportation system.

This report examines the use, condition and funding of Pennsylvania’s roads and bridges as well as its public transportation system. Also included in the report are individualized analyses for the Philadelphia, Pittsburgh, Harrisburg, and Scranton/Wilkes-Barre urban areas. These individualized reports cover each respective city and the surrounding metropolitan area and contain regional data on road and bridge conditions, congestion, transit use, transit system conditions, and traffic safety, as well as lists of each area’s most deteriorated roads and bridges. These regional assessments are included as Appendices A through D in the report. All data used in the report is the latest available.

Pennsylvania residents incur a significant financial cost as a result of roads and highways being congested, deteriorated or lacking some desirable safety features. Failure to improve the state’s transportation network will likely increase these costs.

- TRIP estimates that Pennsylvania’s roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions cost the state’s drivers approximately \$8.2 billion annually in the form of traffic crashes, additional vehicle operating costs (VOC) and congestion-related delays. Appendices A-D of the report contain regional data and cost breakdowns for the state’s largest urban areas.

	VOC	Congestion	Safety	TOTAL
Harrisburg	\$ 293	\$ 180	\$ 399	\$ 872
Philadelphia	\$ 522	\$ 786	\$ 166	\$ 1,474
Pittsburgh	\$ 411	\$ 300	\$ 181	\$ 892
Scranton- Wilkes Barre	\$ 478	\$ 180	\$ 342	\$ 1,000
STATEWIDE	\$2.9 billion	\$2.3 billion	\$3 billion	\$8.2 billion

- Approved in February 2009, the American Recovery and Reinvestment Act offered a significant, short-term boost in transportation funding in Pennsylvania by providing \$1.0 billion for road and bridge improvements and \$343.7 million for the state's public transit system. However, this funding is not sufficient to allow the state to proceed with many needed long-term projects that would improve safety, relieve congestion, enhance economic productivity and rehabilitate the state's roadway and transit system.
- Numerous projects needed to maintain and expand the current transportation system will not be able to move forward without a significant, long-term boost in funding at the local, state or federal level.
- A recent report from the Pennsylvania State Transportation Advisory Committee shows that the state faces an annual transportation funding shortfall of \$3.5 billion to meet highway, bridge and transit needs.
- Making needed repairs to the state's transportation system can help boost Pennsylvania's economy. A 2007 analysis by the Federal Highway Administration found that every \$1 billion invested in highway construction would support approximately 27,800 jobs, including approximately 9,500 in the construction sector, approximately 4,300 jobs in industries supporting the construction sector, and approximately 14,000 other jobs induced in non-construction related sectors of the economy.
- The Federal Highway Administration estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of \$5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs, and reduced emissions as a result of improved traffic flow.
- Pennsylvania's unemployment rate more than doubled over the past three years, from 4.4 percent in September 2007 to 9.0 percent in September 2010.

Increases in the state's population and rate of vehicle travel have placed additional stress on Pennsylvania's roadways and transit systems, resulting in rising congestion and additional deterioration. Traffic congestion in Pennsylvania is a growing burden in key urban areas and threatens to impede the state's economic development.

- Vehicle travel on Pennsylvania's major highways increased by 26 percent from 1990 to 2008 – jumping from 85.7 billion vehicle miles traveled (VMT) in 1990 to 108 billion VMT in 2008. Vehicle travel in Pennsylvania is expected to increase by another 25 percent by 2025, reaching approximately 135 billion VMT.
- Pennsylvania's population reached approximately 12.6 million in 2009, an increase of six percent and nearly three quarters of a million people since 1990. Pennsylvania's population is expected to increase to 12.77 million by 2030.

- From 1990 to 2008, Pennsylvania's gross domestic product (GDP), a measure of the state's economic output, increased by 35 percent, when adjusted for inflation.
- Congestion on Pennsylvania's urban highways is growing as a result of increases in vehicle travel and population. In 2008, 34 percent of Pennsylvania's urban highways were congested, carrying traffic volumes that result in significant rush hour delay.
- The statewide cost of traffic congestion, in the form of lost time and wasted fuel, is approximately \$2.3 billion annually.

Driving on rough roads costs the average Pennsylvania motorist approximately \$341 per year in extra vehicle operating costs – a total of \$2.9 billion statewide.

- In 2008, 15 percent of major roads in Pennsylvania were rated in poor condition. Another 28 percent of the state's major roads were rated in mediocre condition. Major roads include the state's Interstates, freeways and arterials.
- Roads rated in poor condition often have significant rutting, potholes or other visible signs of deterioration and typically need to be resurfaced or reconstructed. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.
- Driving on roads in need of repair costs each Pennsylvania motorist an average of \$341 annually in extra vehicle operating costs, a total of \$2.9 billion statewide. These costs include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear.
- The functional life of Pennsylvania's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that structures last as long as possible. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.
- This report contains information on pavement conditions in Pennsylvania's major metropolitan areas, including Philadelphia, Pittsburgh, Harrisburg and the Scranton/Wilkes-Barre area. Also included is a list of the sections of roadway in each of these urban areas that are most deteriorated and in need of repair. These regional assessments can be found in Appendices A through D of the report.

Pennsylvania has the greatest percentage of structurally deficient bridges in the country. This includes all bridges that are 20 feet or more in length and are maintained by state, local and federal agencies.

- Twenty-seven percent of Pennsylvania's bridges were structurally deficient in 2009. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges are often posted for lower weight or closed to traffic, restricting or redirecting commercial trucks and other larger vehicles including emergency service vehicles.

- Seventeen percent of Pennsylvania's bridges were functionally obsolete in 2009. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes and shoulders, inadequate clearances or poor alignment.
- The report contains a list of needed bridge rehabilitation and replacement projects across the state that currently lack adequate funding to proceed.
- This report contains information on bridge conditions in Pennsylvania's major metropolitan areas, including Philadelphia, Pittsburgh, Harrisburg and the Scranton/Wilkes-Barre area. Also included in the report is a list of bridges in each of these areas that are most deteriorated and in need of repair. These regional assessments can be found in Appendices A through D of the report.

Pennsylvania's rural traffic fatality rate is nearly three times greater than the fatality rate on all other roads in the state. Improving safety features on Pennsylvania's roads and highways would result in a decrease in traffic fatalities in the state. Roadway characteristics are likely a contributing factor in approximately one-third of all fatal and serious traffic accidents.

- Between 2004 and 2008, 7,590 people were killed in traffic accidents in Pennsylvania, an average of 1,518 fatalities per year.
- Pennsylvania's traffic fatality rate was 1.36 fatalities per 100 million vehicle miles of travel in 2008, higher than the national average of 1.25.
- The traffic fatality rate in 2008 on Pennsylvania's non-Interstate rural roads was 2.65 traffic fatalities per 100 million vehicle miles of travel, which is nearly three times higher than the traffic fatality rate of .91 on all other roads and highways in the state.
- Several factors are associated with vehicle accidents that result in fatalities, including driver behavior, vehicle design and roadway characteristics.
- TRIP estimates that roadway characteristics, such as lane widths, lighting, signage and the presence or absence of guardrails, paved shoulders, traffic lights, rumble strips, obstacle barriers, turn lanes, median barriers and pedestrian or bicycle facilities, were likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.
- Where appropriate, highway improvements can reduce traffic fatalities and accidents while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.
- Pennsylvania has the highest percentage of rural narrow lanes (less than 12 feet wide) in the country – 41 percent. The U.S. average is 10 percent.

- The Federal Highway Administration has found that every \$100 million spent on needed highway safety improvements will result in 145 fewer traffic fatalities over a 10-year period.
- The cost of serious traffic crashes in Pennsylvania in 2008, in which roadway characteristics were likely a contributing factor, was approximately \$3 billion. The costs associated with serious crashes include lost productivity, lost earnings, medical costs and emergency services.

The efficiency of Pennsylvania’s transportation system, particularly its highways, is critical to the health of the state’s economy. Businesses are increasingly reliant on an efficient and reliable transportation system to move products and services. A key component in business efficiency and success is the level and ease of access to customers, markets, materials and workers.

- Approximately \$489 billion in goods are shipped annually from sites in Pennsylvania and another \$458 billion in goods are shipped annually to sites in Pennsylvania, mostly by commercial trucks on the state’s highways.
- Seventy-seven percent of the goods shipped annually from sites in Pennsylvania are carried by trucks and another 14 percent are carried by courier services, which use trucks for part of the deliveries. Commercial trucking in Pennsylvania is projected to increase 17 percent by 2020.
- Increasingly, companies are looking at the quality of a region’s transportation system when deciding where to relocate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient transportation system.
- Businesses have responded to improved communications and greater competition by moving from a push-style distribution system, which relies on low-cost movement of bulk commodities and large-scale warehousing, to a pull-style distribution system, which relies on smaller, more strategic and time-sensitive movement of goods.

All data used in the report is the latest available. Sources of information for this report include the U.S. Department of Transportation (USDOT), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania State Transportation Advisory Committee, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI).

Introduction

Pennsylvania's system of roads, highways, bridges and public transportation needs to provide the state's residents and visitors with a high level of mobility. As the backbone of the Keystone State's surface transportation system, roads, bridges and public transit, play a central role in the state's diverse economy and are expected to make it possible for residents and visitors to go to work, visit family and friends, move goods to market, and frequent tourist attractions.

Pennsylvania faces significant challenges in repairing and maintaining its deteriorated system of roads, bridges and public transportation. The modernization of Pennsylvania's surface transportation network is crucial to providing a smooth and efficient transportation system, while improving the economic livelihood of the state and accommodating future growth. As travel on Pennsylvania's surface transportation system becomes more efficient and the physical condition of the system improves, personal and commercial productivity will increase, boosting economic development statewide.

Without a significant commitment to transportation funding at the state and federal level, many needed projects and improvements can not move forward, jeopardizing Pennsylvania's future mobility and potential for economic development. Even with the added funding the state has received through the federal economic stimulus package, many key projects remain unfunded at current transportation investment levels.

This report examines the condition, use and funding of Pennsylvania's roads, bridges and public transit systems, as well as the state's ability to meet future mobility and traffic safety needs. In addition to statewide data, this report contains regional analyses for the Philadelphia, Pittsburgh, Harrisburg and Scranton/Wilkes-Barre urban areas. For each of these urban areas,

appendices A through D contain road and bridge condition data, lists of the most deteriorated roads and bridges, traffic safety data and information about the condition of various public transportation systems.

Sources of information for this report include the U.S. Department of Transportation (USDOT), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania State Transportation Advisory Committee, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI). All data is the latest available.

Population, Vehicle Travel and Congestion in Pennsylvania

Pennsylvania's population reached approximately 12.6 million in 2009, an increase of six percent and more than 723,000 people since 1990¹. The state's population is expected to increase to 12.77 million by 2030.²

From 1990 to 2008, annual vehicle miles of travel (VMT) in the state increased by 26 percent, from approximately 85.7 billion annual VMT to 108 billion VMT.³ Based on travel and population trends, TRIP estimates that vehicle travel in Pennsylvania will increase by another 25 percent by 2025, reaching approximately 135 billion VMT.⁴

Despite the recent economic downturn, from 1990 to 2008, Pennsylvania's gross domestic product (GDP), a measure of the state's economic output, increased by 35 percent, when adjusted for inflation.⁵

Traffic congestion in Pennsylvania is a growing burden in key urban areas and threatens to impede the state's economic development. Congestion on Pennsylvania's urban highways is growing as a result of increases in vehicle travel and population.

In 2008, 34 percent of Pennsylvania's urban roads and highways were congested, carrying traffic volumes that result in significant rush hour delays.⁶ Highways that carry high levels of traffic are also more vulnerable to experiencing significant traffic delays as a result of accidents or other incidents. The statewide cost of traffic congestion in lost time and wasted fuel is approximately \$2.3 billion annually.⁷

Because of increases in the state's population and the rate of travel of its residents, the demands being placed on Pennsylvania's roads and highways far exceed their current capacity. It is critical that Pennsylvania develop and maintain a modern transportation system that can foster economic development and accommodate future growth in population and vehicle travel.

Condition of Pennsylvania's Roads

The conditions of Pennsylvania's major roads are measured annually.⁸ In 2008, 43 percent of Pennsylvania's roads were in poor or mediocre condition. In 2008, 15 percent of major roads in Pennsylvania were rated in poor condition.⁹ Another 28 percent of the state's major roads were rated in mediocre condition.¹⁰ Major roads include the state's Interstates, freeways and arterials.

Pavement conditions on the state's major urban roadways are particularly rough. The following chart shows pavement conditions in the state's largest urban areas. Each urban area has a high percentage of roads in poor and mediocre condition.

Chart 1. Percentage of major roads in poor, mediocre, fair and good condition in Pennsylvania urban areas.

	Poor	Mediocre	Fair	Good
Harrisburg	11	33	23	33
Philadelphia	37	35	16	13
Pittsburgh	22	36	21	21
Scranton/Wilkes-Barre	28	41	18	13

Source: TRIP analysis of Federal Highway Administration data

A desirable goal for state and local organizations that are responsible for road maintenance is to keep 75 percent of major roads in good condition.¹¹ In Pennsylvania, 35 percent of the state’s major roads were in good condition in 2008.¹²

Roads rated in poor condition often have significant ruts, potholes or other visible signs of deterioration and typically need to be resurfaced or reconstructed. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

Pavement failure is caused by a combination of factors, including traffic, moisture and climate, the materials used and the quality of construction. Moisture often works its way into road surfaces and the materials that form the road’s foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress.

The functional life of Pennsylvania’s roads is greatly affected by the state’s ability to perform timely maintenance and upgrades to ensure that structures last as long as possible. Because reconstructing roads costs approximately four times more than resurfacing them, it is critical that roads are fixed before they require major repairs.¹³

In addition to documenting statewide pavement conditions, Appendices A through D of this report contain separate breakdowns and information on pavement conditions in

Pennsylvania's major urban areas, including Philadelphia, Pittsburgh, Scranton/Wilkes-Barre, and Harrisburg. Also included is a list of the sections of roadway that are most deteriorated and in need of repair in each of these urban areas.

The Cost to Motorists of Roads in Inadequate Condition

TRIP has calculated the additional cost to motorists of driving on roads in poor or unacceptable condition. When roads are in poor condition, which may include potholes, ruts or rough surfaces, the cost to operate and maintain a vehicle increases. These additional vehicle operating costs include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional vehicle operating costs borne by Pennsylvania motorists as a result of poor road conditions is \$2.9 billion annually, or \$341 per motorist.¹⁴

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.¹⁵

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 vehicle operating cost estimate is based on taking the average number of miles driven annually by a region's driver, calculating current vehicle operating costs based on AAA's 2010 vehicle operating costs and then using the HDM model to estimate the additional vehicle operating costs paid by drivers as a result of substandard roads.¹⁶ 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.

Bridge Conditions in Pennsylvania

Pennsylvania's bridges and overpasses form key links in the state's highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, as well as facilitating commerce and access for emergency vehicles. But the state's bridges and overpasses are aging and deteriorating and a significant number are in need of repair or replacement.

In 2009, 44 percent of Pennsylvania's 22,293 bridges (20 feet or longer) were rated either structurally deficient or functionally obsolete.¹⁷ Pennsylvania had the greatest percentage of structurally deficient bridges in the country in 2009: 27 percent. In addition, 17 percent were rated as functionally obsolete in 2009.¹⁸

Chart 2. Bridge Conditions in Pennsylvania, 2009.

BRIDGE CONDITION	NUMBER OF BRIDGES	PERCENT DEFICIENT
Structurally Deficient	6,060	27%
Functionally Obsolete	3,714	17%
Total Bridges Deficient or Obsolete	9,774	44%

Source: Federal Highway Administration, National Bridge Inventory

A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges 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. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

Appendices A through D of this report contain information on bridge conditions in Pennsylvania’s major urban areas (includes the city and surrounding areas). These areas are the Philadelphia, Pittsburgh, Harrisburg, and Scranton/Wilkes-Barre areas. Also included are lists of bridges in each area that are most deteriorated and in need of repair.

Traffic Safety in Pennsylvania

A total of 7,590 people were killed in motor vehicle crashes in Pennsylvania from 2004 through 2008, an average of 1,518 fatalities per year.¹⁹

Pennsylvania’s traffic fatality rate was 1.36 fatalities per 100 million vehicle miles of travel in 2008. The national average fatality rate per 100 million vehicle miles of travel in 2008 was 1.25.²⁰

Pennsylvania’s rural, non-Interstate roads have a fatality rate nearly three times higher than all other roads in the state. The traffic fatality rate in 2008 on Pennsylvania’s non-Interstate rural roads was 2.65 traffic fatalities per 100 million vehicle miles of travel.²¹ The traffic fatality rate per 100 million vehicle miles of travel on all other roads and highways in the state was .91 in 2008.²²

Chart 7. Traffic fatalities in Pennsylvania from 2004 – 2008.

<i>Year</i>	<i>Fatalities</i>
2004	1,490
2005	1,616
2006	1,525
2007	1,491
2008	1,468
Total	7,590

Source: National Highway Traffic Safety Administration

Three major factors are associated with fatal vehicle accidents: the vehicle, the driver and the roadway. TRIP estimates that roadway characteristics, such as lane widths, lighting, signage and the presence or absence of guardrails, paved shoulders, traffic lights, rumble strips, obstacle barriers, turn lanes, median barriers and pedestrian or bicycle facilities, were likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.

Improving safety on Pennsylvania’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.

Where appropriate, the severity of serious traffic crashes could be reduced through roadway improvements such as adding turn lanes, removing or shielding obstacles, adding or improving medians, widening lanes, adding side or center rumble strips, widening and paving shoulders, improving intersection layout, and providing better road markings and upgrading or installing traffic signals.

Roads with poor geometry, with insufficient clear distances, without turn lanes, inadequate shoulders for the posted speed limits, or poorly laid out intersections or interchanges, pose greater risks to motorists, pedestrians and bicyclists.

A recent report from the Reason Foundation found that Pennsylvania has the highest percentage of rural narrow lanes (less than 12 feet wide) in the country – 41.1 percent. The U.S. average is 10.3 percent.²³

Traffic accidents and fatalities in which roadway characteristics were likely a contributing factor cost Pennsylvanians approximately \$3 billion annually, including medical costs, lost economic and household productivity, property damage and travel delays.²⁴ Roadway characteristic-related safety costs are estimated at \$352 annually per Pennsylvania driver.²⁵

The following chart shows the correlation between specific needed road improvements and the reduction of fatal accident rates nationally.²⁶

Chart 8. National reduction in fatal accident rates after needed roadway improvements.

Type of Improvement	Reduction in Fatal Accident Rates after Improvements
New Traffic Signals	53%
Turning Lanes and Traffic Signalization	47%
Widen or Modify Bridge	49%
Construct Median for Traffic Separation	73%
Realign Roadway	66%
Remove Roadside Obstacles	66%
Widen or Improve Shoulder	22%

Source: TRIP analysis of U.S. Department of Transportation data

Importance of Transportation to Economic Growth

Pennsylvania relies on an efficient transportation system to support economic development. Reliable transportation access is critical to the health of Pennsylvania's diverse industries such as manufacturing, financial services and insurance, agriculture, mining, recreation and tourism, which have made the state's economy the sixth largest in the U.S.

Today's business culture demands that a region have well-maintained and efficient roads, highways and bridges if it wants to remain economically competitive. The advent of modern national and global communications and the impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement. Consequently, the quality of a region's transportation system has become a key component in a business's ability to compete locally, nationally and internationally.

Businesses have responded to improved communications and the greater necessity to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management, and by accepting customer orders through the Internet. The result of these changes has been a significant improvement in logistics efficiency as businesses move away from a push-style distribution system, which relies on large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods. These improvements have made mobile inventories the norm, resulting in the nation's trucks literally becoming rolling warehouses.

Highways are vitally important to continued economic development in the Keystone State. As the economy expands, creating more jobs and increasing consumer confidence, the demand for consumer and business products grows. In turn, manufacturers ship greater quantities of goods to market to meet this demand, a process that adds to truck traffic on the state's highways and major arterial roads.

An analysis of commodity transport by the U.S. Bureau of Transportation Statistics (BTS) and U.S. Census Bureau underscored the economic importance of Pennsylvania's road system. The BTS report found \$489 billion in goods are shipped annually from sites in Pennsylvania and another \$458 billion in goods are shipped to sites in Pennsylvania, mostly by commercial trucks on the state's highways.²⁷ Seventy-seven percent of the goods shipped annually from sites in Pennsylvania are carried by trucks and another 14 percent are carried by courier services, which use trucks for part of the deliveries.²⁸

Trucking is a crucial part of Pennsylvania's economy, as commercial trucks move goods from sites across the state to markets inside and outside the state. Commercial truck travel in the state is expected to increase significantly over the next two decades. Based on federal

projections, TRIP estimates that commercial trucking in Pennsylvania will increase by 17 percent between 2010 and 2020.²⁹

Transportation Funding in Pennsylvania

Approved in February 2009, the American Recovery and Reinvestment Act offered a significant, short-term boost in transportation funding in Pennsylvania by providing \$1.0 billion for road and bridge improvements and \$343.7 million for the state's public transit system.³⁰ However, this funding is not sufficient to allow the state to proceed with needed long-term projects that will improve safety, reduce congestion and expand capacity.

Without a significant, long-term increase in transportation funding, road and bridge conditions will continue to deteriorate, congestion will worsen, and the condition of Pennsylvania's public transportation system will decline.

According to a recent report from the Pennsylvania State Transportation Advisory Committee, the state will need to spend an additional \$3.5 billion annually in order to maintain and repair the state's roads, bridges and transit systems.³¹ This funding shortfall has contributed to a growing list of transportation projects throughout the state that, while needed, will not move forward without additional funding from state, federal or local sources.

Making needed repairs to the state's transportation system can help boost Pennsylvania's economy. A 2007 analysis by the Federal Highway Administration found that every \$1 billion invested in highway construction would support approximately 27,800 jobs, including approximately 9,500 in the construction sector, approximately 4,300 jobs in industries supporting the construction sector, and approximately 14,000 other jobs induced in non-construction related sectors of the economy.³²

The Federal Highway Administration estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of \$5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs and reduced emissions as a result of improved traffic flow.³³

Conclusion

Pennsylvania faces a significant challenge in the need to modernize and improve its highway and transit system. The state's system of roads, highways, bridges and public transit play a central role in the Keystone State's economy. Meeting Pennsylvania's goals for sound economic growth, a high standard of living and strong economic progress will require the state to build and maintain a modern highway and public transit system.

Making needed improvements to Pennsylvania's surface transportation system could also provide a significant boost to the state's economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

The federal stimulus package has provided a helpful down payment for the improvement of Pennsylvania's transportation system. However, without a substantial, long term boost in local, state or federal surface transportation funding, numerous projects to improve the condition and expand the capacity of Pennsylvania's roads, bridges, highways and transit systems will not be able to proceed, hampering the state's ability to improve the condition of its surface transportation system and to enhance economic development opportunities in the state.

Endnotes

-
- ¹ U.S. Census Bureau annual population estimate.
- ² U.S. Census Bureau, Population Division, Interim State Population Projections, 2005.
- ³ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 1990 and Federal Highway Administration 2008 VMT.
- ⁴ TRIP estimate based on analysis of FHWA data.
- ⁵ TRIP analysis of data from the U.S. Bureau of Economic Analysis. The nation's Gross Domestic Product has been adjusted for inflation based on the Consumer Price Index.
- ⁶ TRIP analysis of Federal Highway Administration data. Highway Statistics 2007, Table HM-61. Interstate and Other Freeways and Expressways will a volume-service flow ratio above .70, which is the standard for mild congestion, are considered congested.
- ⁷ TRIP estimate based on analysis of data in the 2009 Urban Mobility Report, Texas Transportation Institute and Highway Statistics, 2008, Federal Highway Administration.
- ⁸ TRIP pavement condition data is for all arterial mileage, including Interstates. Pavement conditions are determined using the following scale: IRI: good: 0-94; fair: 95-119; mediocre: 95-119; poor: 171 and above; PSR: good: 3.5 and above; fair: 3.1-3.4; mediocre: 2.6 – 3; poor: 2.5 and below.
- ⁹ Highway Statistics, 2008, Federal Highway Administration. HM-63, HM-64.
- ¹⁰ *Ibid.*
- ¹¹ Why We Must Preserve our Pavements, D. Jackson, J. Mahoney, G. Hicks, 1996 International Symposium on Asphalt Emulsion Technology.
- ¹² U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2008. HM-63, HM-64. www.fhwa.dot.gov.
- ¹³ Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.
- ¹⁴ TRIP estimate based on calculating share of travel occurring on roads in various conditions and the annual impact on motorists' costs based on estimates provided by AAA.
- ¹⁵ Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.
- ¹⁶ Your Driving Costs. American Automobile Association. 2010.
- ¹⁷ Federal Highway Administration – National Bridge Inventory 2009.
- ¹⁸ *Ibid.*
- ¹⁹ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2004-2008 www.fhwa.dot.gov and www-fars.nhtsa.dot.gov.
- ²⁰ TRIP analysis of 2008 NHTSA and FHWA data.
- ²¹ *Ibid.*
- ²² *Ibid.*
- ²³ The Reason Foundation, 18th Annual Highway Report, December 2009.
- ²⁴ TRIP estimate based on National Highway Traffic Safety Administration's CrashCost model.
- ²⁵ *Ibid.*
- ²⁶ Highway Safety Evaluation System; 1996 Annual Report on Highway Safety Improvement Programs; U.S. Department of Transportation
- ²⁷ 2007 Commodity Flow Survey, U.S. Census Bureau – Bureau of Transportation Statistics. www.census.gov.
- ²⁸ *Ibid.*
- ²⁹ TRIP estimated based on U.S. Department of Transportation: Office of Freight Management and Operations. www.fhwa.dot.gov.
- ³⁰ Federal Highway Administration and Federal Transit Administration estimates.
- ³¹ Pennsylvania State Transportation Advisory Committee: Transportation Funding Study. May, 2010. <ftp://ftp.dot.state.pa.us/public/bureaus/Press/TACFullReport.pdf>
- ³² Federal Highway Administration (2007). Employment Impacts of Highway Infrastructure Investment.
- ³³ FHWA estimate based on its analysis of 2006 data. For more information on FHWA's cost-benefit analysis of highway investment, see the 2008 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance.