# *MICHIGAN TRANSPORTATION BY THE NUMBERS:*

## Meeting the State's Need for Safe and Efficient Mobility

**JANUARY 2014**


TRIP
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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.*

# Ten Key Transportation Numbers in Michigan

| | |
|---|---|
| **$7.7 billion** | TRIP estimates that Michigan roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions cost the state's residents approximately $7.7 billion annually in the form of additional vehicle operating costs, lost time and wasted fuel due to traffic congestion and traffic crashes. |
| **$1,600**<br>**$1,027**<br>**$1,032** | The annual costs per motorist of driving on roads that are congested, deteriorated and that lack some desirable safety features in Michigan's largest urban areas are: Detroit - $1,600; Grand Rapids - $1,027; Lansing - $1,032. |
| **57%**<br>**40%**<br>**49%** | In the Detroit area, 57 percent of major urban roads are in poor or mediocre condition, while 40 percent of major urban roads in the Grand Rapids area are in poor or mediocre condition. Forty-nine percent of major urban roads in the Lansing metro area are in poor or mediocre condition. |
| **924**<br>**4,620** | From 2008 to 2012, on average 924 people were killed annually in Michigan traffic crashes, a total of 4,620 fatalities over the five year period. |
| **27 %** | A total of 27 percent of Michigan bridges are in need of repair, improvement or replacement. Twelve percent of the state's bridges are structurally deficient and 15 percent are functionally obsolete. |
| **67 %** | Sixty-seven percent of goods shipped annually in Michigan, measured by weight, travel by truck. |
| **2X** | The fatality rate on Michigan's non-interstate rural roads is nearly double that on all other roads in the state (1.47 fatalities per 100 million vehicle miles of travel vs. 0.75). |
| **$1.1 billion** | If a lack of adequate revenue into the Federal Highway Trust Fund is not addressed by Congress, funding for highway and transit improvements in Michigan could be cut by $1.1 billion for federal fiscal year 2015 beginning October 1, 2014. |
| **95 billion** | Michigan's roads and highways carried 95 billion vehicle miles of travel in 2012. |
| **7,059,509** | There are 7,059,509 licensed drivers in Michigan. |

# Executive Summary

Michigan's extensive system of roads, highways and bridges provides the state's residents, visitors and businesses with a high level of mobility. This transportation system forms the backbone that supports the state's economy. Michigan's surface transportation system enables the state's residents and visitors to travel to work and school, visit family and friends, and frequent tourist and recreation attractions while providing its businesses with reliable access to customers, materials, suppliers and employees.

As Michigan looks to retain its businesses, maintain its level of economic competitiveness and achieve further economic growth, the state will need to maintain and modernize its roads, highways and bridges by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient and reliable mobility for motorists and businesses. Making needed improvements to Michigan's roads, highways and bridges 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.

With a current unemployment rate of 9.0 percent, Michigan must improve its system of roads, highways and bridges to foster economic growth and keep businesses in the state. In addition to economic growth, transportation improvements are needed to ensure safe, reliable mobility and quality of life for all Michiganders. Meeting Michigan's need to modernize and maintain its system of roads, highways and bridges will require a significant boost in local, state and federal funding.

**An inadequate transportation system costs Michigan residents a total of $7.7 billion every year in the form of additional vehicle operating costs (VOC), congestion-related delays and traffic crashes.**

- TRIP estimates that Michigan roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions cost the state's residents approximately $7.7 billion annually in the form of additional vehicle operating costs, the cost of lost time and wasted fuel due to traffic congestion and traffic crashes.

- TRIP has calculated the annual cost to Michigan residents of driving on roads that are deteriorated, congested and lack some desirable safety features both statewide and in the state's largest urban area. The following chart shows the cost breakdown for these areas.

| Location | VOC | Congestion | Safety | TOTAL |
|---|---|---|---|---|
| Detroit | $ 536 | $ 859 | $ 205 | $ 1,600 |
| Grand Rapids | $ 327 | $ 501 | $ 199 | $ 1,027 |
| Lansing | $ 305 | $ 455 | $ 272 | $ 1,032 |
| **Michigan - Statewide Total** | **$2.3 Billion** | **$3.1 Billion** | **$2.3 Billion** | **$7.7 Billion** |

**Population and economic growth in Michigan have resulted in increased demands on the state's major roads and highways, leading to increased wear and tear on the transportation system.**

- Michigan's population reached 9.9 million in 2012, a six percent increase since 1990.
- Michigan's roads and highways carried 95 billion vehicle miles of travel in 2012.
- By 2030, vehicle travel in Michigan is projected to increase by another 15 percent.
- From 1990 to 2012, Michigan's gross domestic product, a measure of the state's economic output, increased by 20 percent, when adjusted for inflation.

**More than a quarter of major locally and state-maintained roads and highways in Michigan have pavement surfaces in poor or mediocre condition, providing a rough ride and costing motorist in the form of additional vehicle operating costs.**

- Thirteen percent of Michigan's major roads and highways have pavements in poor condition, while an additional 16 percent of the state's major roads are rated in mediocre condition. Ten percent are rated in fair condition and the remaining 61 percent are rated in good condition.
- The pavement data in this report for all arterial roads and highways is provided by the Federal Highway Administration, based on data submitted annually by the Michigan Department of Transportation (MDOT) on the condition of major state and locally maintained roads and highways in the state.
- In the Detroit urban area, 35 percent of major locally and state-maintained roads are rated in poor condition and 22 percent are rated in mediocre condition. Twelve percent of Detroit's major urban roads are rated in fair condition and 31 percent are rated in good condition.
- Sixteen percent of major urban roads in the Grand Rapids urban area are rated in poor condition and 24 percent are rated in mediocre condition. Nine percent of Grand Rapids' major urban roads are rated in fair condition and 51 percent are rated in good condition.
- In the Lansing urban area, 10 percent of major locally and state-maintained roads are rated in poor condition and 39 percent are rated in mediocre condition. Six percent of Lansing's major urban roads are rated in fair condition and 46 percent are rated in good condition.
- Roads rated in poor condition may show signs of deterioration, including rutting, cracks and potholes. In some cases, poor roads can be resurfaced, but often are too deteriorated and must be reconstructed. Roads rated in mediocre condition may 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 rough roads costs Michigan motorists a total of $2.3 billion annually in extra vehicle operating costs. Costs include accelerated vehicle depreciation, additional repair costs, and increased fuel consumption and tire wear.
- Driving on rough roads costs the average Detroit urban area motorist $536 annually in extra vehicle operating costs, while the average driver in the Grand Rapids urban area loses $327 each year as a result of driving on deteriorated roads. In the Lansing urban area, the average motorist loses $305 annually due to driving on rough roads.

**Twenty-seven percent of bridges in Michigan show significant deterioration or do not meet current design standards often because of narrow lanes, inadequate clearances or poor alignment. This includes all bridges that are 20 feet or more in length.**

- Twelve percent of Michigan's bridges are structurally deficient. 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 large vehicles, including commercial trucks and emergency services vehicles.

- Fifteen percent of Michigan's bridges are functionally obsolete. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

**Significant levels of traffic congestion cause significant delays in Michigan, particularly in its larger urban areas, choking commuting and commerce.**

- According to the Texas Transportation Institute (TTI), the average driver in the Detroit urban area loses $859 each year in the cost of lost time and wasted fuel as a result of traffic congestion. The average commuter in the Detroit urban area wastes 40 hours each year stuck in traffic.

- TTI estimates that the average Grand Rapids-area driver loses $501 annually in the cost of lost time and wasted fuel due to congestion. The average Grand Rapids commuter wastes 24 hours to traffic congestion every year.

- Based on FHWA and TTI data, TRIP estimates the average Lansing-area motorist loses $455 each year in the form of lost time and wasted fuel due to congestion. The average Lansing driver wastes 23 hours annually in traffic congestion.

**Michigan's traffic fatality rate on rural, non-Interstate routes is nearly double that on all other roads and highways in the state. Improving safety features on Michigan's roads and highways would likely result in a decrease in the state's traffic fatalities and serious crashes. Roadway features are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.**

- Between 2008 and 2012 a total of 4,620 people were killed in traffic crashes in Michigan, an average of 924 fatalities per year.

- Michigan's overall traffic fatality rate of 0.99 fatalities per 100 million vehicle miles of travel in 2012 is lower than the national average of 1.13.

- The fatality rate on Michigan's rural non-Interstate roads was 1.47 fatalities per 100 million vehicle miles of travel, nearly double the 0.75 fatality rate on all other roads and highways in the state.

- The annual cost of serious traffic crashes in Michigan in which roadway features were likely a contributing factor, is approximately $2.3 billion.

- The annual cost per motorist of traffic crashes in which roadway features were likely a contributing factor in the state's major urban areas are: Detroit - $205; Grand Rapids - $199; Lansing - $272.

- 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. The cost of serious crashes includes lost productivity, lost earnings, medical costs and emergency services.

- Several factors are associated with vehicle crashes that result in fatalities, including driver behavior, vehicle characteristics and roadway features. TRIP estimates that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes.

- Where appropriate, highway improvements can reduce traffic fatalities and crashes for motorists, pedestrian and bicyclists while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; improved lighting; improving intersection design, adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.

- Investments in rural traffic safety have been found to result in significant reductions in serious traffic crashes. A 2012 report by the Texas Transportation Institute (TTI) found that improvements completed recently by the Texas Department of Transportation that widened lanes, improved shoulders and made other safety improvements on 1,159 miles of rural state roadways resulted in 133 fewer fatalities on these roads in the first three years after the improvements were completed (as compared to the three years prior). TTI estimates that the improvements on these roads are likely to save 880 lives over the next 20 years.

**The efficiency of Michigan'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. Michigan is heavily reliant on federal dollars to fund its transportation system.**

- Michigan's transportation system moved 434 million tons of freight, valued at $520 billion in 2009, mostly by truck.

- Trucking accounted for 67 percent of the freight tonnage moved in 2009, followed by rail at 19 percent, water at 14 percent and air at less than one percent.

- Increasingly, companies are looking at the quality of a region's transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system.

- Highway accessibility was ranked the number one site selection factor in a 2011 survey of corporate executives by Area Development Magazine.

- 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.

**The federal government remains a critical source of funding for Michigan's roads, highways and bridges and provides a significant return to Michigan in road and bridge funding based on the revenue generated in the state by the federal motor fuel tax.**

- MAP-21(Moving Ahead for Progress in the 21st Century Act), the current federal surface transportation program approved by Congress in July 2012, greatly increased funding flexibility for states and streamlined project approval processes to improve the efficiency of state and local transportation agencies in providing needed transportation improvements in the state.

- MAP-21 does not provide sufficient long-term revenues to support the current level of federal surface transportation investment. Nationwide federal funding for highways is expected to be cut by almost 100 percent from the current investment level for the fiscal year starting October 1, 2014 (FY 2015) unless Congress provides additional transportation revenues. This is due to a cash shortfall in the Highway Trust Fund as projected by the Congressional Budget Office.

- If the funding shortfalls into the federal Highway Trust Fund are addressed solely by cutting spending it is estimated that federal funding for highway and transit improvements in Michigan will be cut by $1.1 billion for the federal fiscal year starting October 1, 2014, unless Congress provides additional transportation revenues.

- From 2007 to 2011, the federal government provided $1.20 for road improvements in Michigan for every one dollar paid in federal motor fuel fees.

- From 2007 to 2011, federal revenues accounted for 31 percent of state spending on Michigan's roads, highways and bridges.

*Sources of information for this report include the Michigan Department of Transportation (MDOT), the Federal Highway Administration (FHWA), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the Texas Transportation Institute (TTI) and the National Highway Traffic Safety Administration (NHTSA). All data used in the report is the latest available.*

# Introduction

Michigan's roads, highways and bridges form vital transportation links for the state's residents, visitors and businesses, providing daily access to homes, jobs, shopping, natural resources and recreation. Today, with the state working to foster quality of life improvements and economic competitiveness, the modernization of Michigan's transportation system is crucial, particularly to critical areas of the state's economy including tourism, agriculture and manufacturing.

As the U.S. and Michigan look to rebound from the recent economic downturn, the preservation and modernization of the state's transportation system could play an important role in enhancing Michigan's economic competitiveness and improving economic well-being by providing critically needed jobs in the short term and by improving the productivity and competitiveness of the state's businesses in the long term. As Michigan faces the challenge of preserving and modernizing its transportation system, the future level of federal, state and local transportation funding will be a critical factor in whether the Great Lakes State's residents and visitors continue to enjoy access to a safe and efficient transportation network. Meeting Michigan's need to modernize and maintain its system of roads, highways and bridges will require a significant boost in local, state and federal funding.

This report examines the condition, use and safety of Michigan's roads, highways and bridges, and the future mobility needs of the state. Sources of information for this report include the Michigan Department of Transportation (MDOT), the Federal Highway Administration (FHWA), the U.S. Census Bureau, the Texas Transportation Institute (TTI), the Bureau of Transportation Statistics (BTS), and the National Highway Traffic Safety Administration

(NHTSA). All data used in the report is the latest available.

## Population, Travel and Economic Trends in Michigan

Michigan residents and businesses require a high level of personal and commercial mobility. Population increases and economic growth in the state have resulted in an increase in the demand for mobility as well as an increase in vehicle miles of travel (VMT). To foster a high quality of life and spur economic growth in Michigan, it will be critical that the state provide a safe and modern transportation system that can accommodate future growth in population, tourism, recreation and vehicle travel.

Michigan's population grew to 9.9 million residents in 2012, a six percent increase since 1990.[1] Michigan had 7,059,509 licensed drivers in 2011.[2] From 1990 to 2012, Michigan's gross domestic product (GDP), a measure of the state's economic output, increased by 20 percent, when adjusted for inflation.[3]

In 2012, Michigan's roads and highways carried 95 billion vehicle miles of travel.[4] Based on population and other lifestyle trends, TRIP estimates that travel on Michigan's roads and highways will increase by another 15 percent by 2030.[5]

## Condition of Michigan's Roads

The life cycle of Michigan's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible. The pavement condition of the state's major roads – generally roads other than

neighborhood roads or minor local roads --is evaluated and classified as being in poor, mediocre, fair or good condition.

Throughout the state, more than a quarter of major roads and highways have deficient pavements, providing motorists with a rough ride.[6] Thirteen percent of Michigan's major roads and highways have pavements rated in poor condition.[7] Another 16 percent of Michigan's major roads are rated in mediocre condition, while 10 percent are rated in fair condition and the remaining 61 percent are rated in good condition.[8]

The pavement data in this report for all arterial roads and highways is provided by the Federal Highway Administration, based on data submitted annually by the Michigan Department of Transportation (MDOT) on the condition of major state and locally maintained roads and highways in the state.

Roads rated poor may show signs of deterioration, including rutting, cracks and potholes. In some cases, poor roads can be resurfaced but often are too deteriorated and must be reconstructed. Roads rated in mediocre condition may show signs of significant wear and may also have some visible pavement distress. Most pavements in fair 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 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 even 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.[9] 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.

In the Detroit urban area, 35 percent of major locally and state-maintained roads are rated in poor condition and 22 percent are rated in mediocre condition.[10] Twelve percent of Detroit's major urban roads are rated in fair condition and 31 percent are rated in good condition.[11] Sixteen percent of major urban roads in the Grand Rapids urban area are rated in poor condition and 24 percent are rated in mediocre condition.[12] Nine percent of major urban roads in Grand Rapids are rated in fair condition and 51 percent are rated in good condition.[13] In the Lansing urban area, 10 percent of major locally and state-maintained roads are rated in poor condition and 39 percent are rated in mediocre condition.[14] Six percent of Lansing's major urban roads are rated in fair condition and 46 percent are rated in good condition.[15]

## The Costs 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, rutting 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 Michigan motorists as a result of poor road conditions total $2.3 billion statewide, annually.[16]

Driving on rough roads costs the average Detroit urban area motorist $536 annually in extra vehicle operating costs, while the average driver in the Grand Rapids urban area loses $327

each year as a result of driving on deteriorated roads. The average Lansing urban area motorist loses $305 annually due to driving on rough roads.[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 vehicle operating cost estimate is based on taking the average number of miles driven annually by a motorist, calculating current vehicle operating costs based on AAA's 2012 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.[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.

## Bridge Conditions in Michigan

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

Twenty-seven percent of Michigan's locally and state- maintained bridges (20 feet or longer) were rated as structurally deficient or functionally obsolete in 2012.[20]

Twelve percent of Michigan's locally and state-maintained bridges are rated as structurally deficient.[21] A bridge is 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.

Fifteen percent of Michigan's locally and state-maintained bridges are rated functionally obsolete.[22] Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment with the approaching roadway.

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, insuring 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.

## Traffic Congestion in Michigan

Commuting and commerce in Michigan are constrained by growing traffic congestion, which will increase in the future unless additional highway and transit capacity is provided. Vehicle travel in Michigan has increased in recent years, without a corresponding increase in roadway lane miles. As a result, the state's roads have become increasingly congested, choking commuting and commerce.

According to the Texas Transportation Institute (TTI), the average driver in the Detroit urban area loses $859 each year in the cost of lost time and wasted fuel as a result of traffic congestion. [23] The average commuter in the Detroit urban area wastes 40 hours each year stuck in traffic. [24] In the Grand Rapids urban area, the average driver loses $501 annually in the cost of lost time and wasted fuel due to congestion, while wasting 24 hours each year in congestion. [25] Based on its analysis of FHWA and TTI data, TRIP estimates that the average Lansing motorist loses $455 each year in the cost of lost time and wasted fuel, as a result of traffic congestion. [26] The average commuter in the Lansing urban area wastes 23 hours each year stuck in traffic. [27] The total cost of traffic congestion annually in Michigan is $3.1 billion in lost time and wasted fuel.[28]

## Traffic Safety in Michigan

A total of 4,620 people were killed in motor vehicle crashes in Michigan from 2008 through 2012, an average of 924 fatalities per year.[29]

**Chart 1. Traffic fatalities in Michigan from 2008 – 2012.**

| *Year* | *Fatalities* |
|---|---|
| 2008 | 980 |
| 2009 | 871 |
| 2010 | 942 |
| 2011 | 889 |
| 2012 | 938 |
| **Total** | **4,620** |

**Source: National Highway Traffic Safety Administration**

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.

Michigan's overall traffic fatality rate of 0.99 fatalities per 100 million vehicle miles of travel in 2012 is lower than the national average of 1.13.[30] The fatality rate on Michigan's non-Interstate rural roads in 2011 was 1.47 fatalities per 100 million vehicle miles of travel, nearly double the fatality rate of 0.75 on all other roads and highways in the state.[31]

The annual cost of serious traffic crashes in Michigan, in which roadway features were likely a contributing factor is approximately $2.3 billion.[32] The cost to motorists of traffic crashes in the state's major urban areas was: Detroit - $205; Grand Rapids - $199; Lansing - $272.[33]

Improving safety on Michigan'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 such as adding turn lanes, removing or shielding obstacles, adding or improving medians, widening lanes, 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, having inadequate shoulders for the posted speed limits, or poorly laid out intersections or interchanges, pose greater risks to motorists, pedestrians and bicyclists.

Investments in rural traffic safety have been found to result in significant reductions in serious traffic crashes. A 2012 report by the Texas Transportation Institute (TTI) found that improvements completed recently by the Texas Department of Transportation that widened lanes, improved shoulders and made other safety improvements on 1,159 miles of rural state roadways resulted in 133 fewer fatalities on these roads in the first three years after the improvements were completed (as compared to the three years prior). TTI estimates that the improvements on these roads are likely to save 880 lives over the next 20 years.[34]

## Transportation Funding

Investment in Michigan's roads, highways and bridges is funded by local, state and federal governments. The federal government provides funding for the state's transportation system largely as part MAP-21 (Moving Ahead for Progress in the 21st Century Act), the current two-year federal surface transportation program, which expires on September 30, 2014.

While MAP-21, approved by Congress in July 2012, increased funding flexibility for states and improved project approval processes to improve the efficiency of state and local

transportation agencies in providing needed transportation improvements, it did not provide sufficient long-term revenues to support the current level of federal surface transportation investment. Nationwide, federal funding for highways is expected to be cut by almost 100 percent from the current investment level for the fiscal year starting October 1, 2014 (FY 2015) unless Congress provides additional transportation revenues. This is due to a cash shortfall in the Highway Trust Fund as projected by the Congressional Budget Office.

If the funding shortfalls into the federal Highway Trust Fund are addressed solely by cutting spending it is estimated that federal funding for highway and transit improvements in Michigan will be cut by $1.1 billion for the federal fiscal year starting October 1, 2014, unless Congress provides additional transportation revenues.[35]

The federal government remains a critical source of funding for Michigan's roads, highways and bridges and provides a significant return to Michigan in road and bridge funding based on the revenue generated in the state by the federal motor fuel tax. From 2007 to 2011, the federal government provided $1.20 for road improvements in Michigan for every one dollar paid in federal motor fuel fees.[36] And, from 2007 to 2011, federal revenues accounted for 31 percent of state spending on Michigan's roads, highways and bridges.[37] MAP-21will fund surface transportation programs in Michigan at approximately $1 billion annually for fiscal years 2013 and 2014.[38]

Increasing investment in the state's roads, highways and bridges could boost Michigan's economy by creating jobs. 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.[39]

## Importance of Transportation to Economic Growth

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. 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 need to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and by Internet commerce. The result of these changes has been a significant improvement in logistics efficiency as firms move 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 Michigan, particularly to the state's tourism, lumber, agriculture and manufacturing sectors. 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.

Michigan's transportation system moved 434 million tons of freight, valued at $520 billion in 2009, mostly by truck.[40] Trucking accounted for 67 percent of the freight tonnage moved in 2009, followed by rail at 19 percent, water at 14 percent and air at less than one percent.[41]

The cost of road and bridge improvements are more than offset by the reduction of user costs associated with driving on rough roads, the improvement in business productivity, the reduction in delays and the improvement in traffic safety. 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.[42]

Local, regional and state economic performance is improved when a region's surface transportation system is expanded or repaired. This improvement comes as a result of the initial job creation and increased employment created over the long-term because of improved access, reduced transport costs and improved safety Highway accessibility was ranked the number one site selection factor in a 2011 survey of corporate executives by Area Development Magazine.[43]

Increasingly, companies are looking at the quality of a region's transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system.

## Conclusion

As Michigan looks to build and enhance a thriving, growing and dynamic state, it will be critical that it is able to provide a 21st century network of roads, highways and bridges that can accommodate the mobility demands of a modern society. And to fully rebound from the recent economic downturn, the U.S. will need to modernize its surface transportation system by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient and reliable mobility for motorists and businesses. Making needed improvements to Michigan's roads, highways and bridges could 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.

Without a substantial boost in federal, state and local highway funding, numerous projects to improve the condition and expand the capacity of Michigan's roads, highways and bridges will not be able to proceed, hampering the state's ability to improve the condition of its transportation system and to enhance economic development opportunities in the state.

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# Endnotes

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[2] Highway Statistics (2011). Federal Highway Administration. DL-1C
[3] TRIP analysis of Bureau of Economic Analysis data.
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[5] TRIP calculation based on U.S. Census and Federal Highway Administration data.
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[27] Ibid.
[28] TRIP estimate based on analysis of FHWA and TTI data.
[29] TRIP analysis of National Highway Traffic Safety Administration data (2013).
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