

# ***MISSOURI TRANSPORTATION BY THE NUMBERS:***

Meeting the State's Need for Safe and Efficient Mobility

**APRIL 2015**



*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 Missouri

<b>\$4.5 billion</b>	Driving on deficient roads costs Missouri motorists a total of \$4.5 billion annually in the form of additional vehicle operating costs (VOC), congestion-related delays and traffic crashes.
<b>\$1,316</b> <b>\$1,327</b> <b>\$1,134</b> <b>\$1,511</b>	TRIP has calculated the cost to the average motorist in Missouri's largest urban areas in the form of additional VOC, congestion-related delays and traffic crashes. The average Jefferson City driver loses \$1,316 annually, while the each Kansas City driver loses \$1,327. Drivers in Springfield lose \$1,134 annually, while the average St. Louis motorist loses \$1,511 annually.
<b>814</b> <b>4,068</b>	On average, 814 people were killed annually in Missouri traffic crashes from 2009 to 2013, a total of 4,068 fatalities over the five year period.
<b>3X</b>	The fatality rate on Missouri's non-interstate rural roads is nearly triple that on all other roads in the state (1.96 fatalities per 100 million vehicle miles of travel vs. 0.68).
<b>22%</b> <b>32%</b> <b>23%</b> <b>19%</b> <b>29%</b>	Statewide, 22 percent of Missouri's major roads are in poor condition. Thirty-two percent of Jefferson City's major roads are in poor condition, while in Kansas City, 23 percent of major roads are in poor condition. Nineteen percent of major urban roads in Springfield are in poor condition and 29 percent of major roads in the St. Louis urban area are in poor condition.
<b>\$226 billion</b> <b>\$234 billion</b>	Annually, \$226 billion in goods are shipped from sites in Missouri and another \$234 billion in goods are shipped to sites in Missouri, mostly by truck.
<b>23 %</b>	A total of 23 percent of Missouri bridges are in need of repair, improvement or replacement. Thirteen percent of the state's bridges are structurally deficient and 10 percent are functionally obsolete.
<b>18 hours</b> <b>27 hours</b> <b>19 hours</b> <b>31 hours</b>	The average driver in the Jefferson City area loses 18 hours to congestion annually, while each driver in the Kansas City urban area loses 27 hours each year. The average Springfield driver loses 19 hours annually, and each St. Louis driver loses 31 hours annually as a result of traffic congestion.
<b>\$1.31</b>	From 2009 to 2013, the federal government provided \$1.31 for road improvements in Missouri for every dollar paid in Missouri in federal motor fuel fees.
<b>\$1.00 =</b> <b>\$5.20</b>	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.

## Executive Summary

Missouri'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. Missouri'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 Missouri works 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 Missouri'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.

Missouri 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 Missourians. Meeting Missouri's need to modernize and maintain its system of roads, highways and bridges will require a significant boost in local, state and federal funding.

Signed into law in July 2012, MAP-21 (Moving Ahead for Progress in the 21<sup>st</sup> Century Act), has improved several procedures that in the past had delayed projects. MAP-21 does not address long-term funding challenges facing the federal surface transportation program. In July 2014 Congress approved the Highway and Transportation Funding Act of 2014, an eight-month extension of the federal surface transportation program, on which states rely for road, highway, bridge and transit funding. The program, initially set to expire on September 30, 2014, now runs through May 31, 2015. In addition to extending the current authorization of the highway and public transportation programs, the legislation will transfer nearly \$11 billion into the Highway Trust Fund (HTF) to preserve existing levels of highway and public transportation investment through the end of May 2015.

Congress will need to pass new legislation prior to the May 31 extension expiration to ensure prompt federal reimbursements to states for road, highway, bridge and transit repairs and improvements.

The level of funding and the provisions of the federal surface transportation program have a significant impact on highway and bridge conditions, roadway safety, transit service, quality of life and economic development opportunities in Missouri.

**An inadequate transportation system costs Missouri residents a total of \$4.5 billion every year in the form of additional vehicle operating costs (VOC), congestion-related delays and traffic crashes.**

- TRIP estimates that Missouri 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 \$4.5 billion annually in the form of additional vehicle operating costs (including accelerated vehicle depreciation, additional repair costs, and increased fuel consumption and tire wear), the cost of lost time and wasted fuel due to traffic congestion, and the financial cost of traffic crashes.
- TRIP has calculated the average cost to drivers in the state’s largest urban areas as a result of driving on roads that are deteriorated, congested and lack some desirable safety features. The chart below details the costs to drivers in the Jefferson City, Kansas City, Springfield and St. Louis urban areas.

<b>Location</b>	<b>VOC</b>	<b>Safety</b>	<b>Congestion</b>	<b>TOTAL</b>
Jefferson City	\$685	\$221	\$410	\$1,316
Kansas City	\$545	\$198	\$584	\$1,327
Springfield	\$455	\$244	\$435	\$1,134
St. Louis	\$596	\$229	\$686	\$1,511
<b>Missouri - Statewide</b>	<b>\$1.7 Billion</b>	<b>\$1.3 Billion</b>	<b>\$1.5 Billion</b>	<b>\$4.5Billion</b>

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

- Missouri’s population reached approximately 6.1 million residents in 2014, an 18 percent increase since 1990. Missouri had 4,280,438 licensed drivers in 2013.
- Vehicle miles traveled (VMT) in Missouri increased by 37 percent from 1990 to 2013 – jumping from 50.9 billion VMT in 1990 to 69.5 billion VMT in 2013.
- By 2030, vehicle travel in Missouri is projected to increase by another 20 percent.
- From 1990 to 2013, Missouri’s gross domestic product, a measure of the state’s economic output, increased by 49 percent, when adjusted for inflation.

**A lack of adequate state and local funding has resulted in 22 percent of major roads and highways in Missouri having pavement surfaces in poor condition, providing a rough ride and costing motorists in the form of additional vehicle operating costs.**

- Twenty-two percent of Missouri’s major roads and highways have pavements in poor condition, while an additional 48 percent of the state’s major roads are rated in mediocre or fair condition and the remaining 30 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.
- Driving on rough roads costs Missouri motorists a total of \$1.7 billion annually in extra vehicle operating costs. Costs include accelerated vehicle depreciation, additional repair costs, and increased fuel consumption and tire wear.
- The chart below details pavement conditions in Jefferson City, Kansas City, Springfield and St. Louis:

Location	Poor	Mediocre	Fair	Good
Jefferson City	32%	34%	12%	22%
Kansas City	23%	32%	15%	30%
Springfield	19%	25%	16%	41%
St. Louis	29%	28%	12%	31%

**Nearly one-quarter of locally and state-maintained bridges in Missouri 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.**

- Thirteen percent of Missouri’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.
- Ten percent of Missouri’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.

**Missouri’s rural traffic fatality rate is nearly three times higher than the fatality rate on all other roads in the state. Improving safety features on Missouri’s roads and highways would likely result in a decrease in the state’s traffic fatalities and serious crashes. It is estimated that roadway features are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.**

- Between 2009 and 2013 a total of 4,068 people were killed in traffic crashes in Missouri, an average of 814 fatalities per year.
- Missouri’s overall traffic fatality rate of 1.09 fatalities per 100 million vehicle miles of travel in 2013 is the same as the national average.

- The fatality rate on Missouri’s rural non-Interstate roads was 1.96 fatalities per 100 vehicle miles of travel in 2013, nearly triple the 0.68 fatality rate on all other roads and highways in the state.
- 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 while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; improved lighting; 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.

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

- Based on methodology used by the Texas Transportation Institute (TTI), TRIP estimates that the average Jefferson City driver loses \$410 annually in the cost of lost time and wasted fuel due to congestion. The average Jefferson City commuter loses 18 hours each year in traffic.
- According to TTI, the average driver in the Kansas City urban area loses \$584 each year in the cost of lost time and wasted fuel as a result of traffic congestion. The average commuter in the Kansas City urban area wastes 27 hours each year stuck in traffic.
- Based on TTI methodology, TRIP estimates that the average Springfield driver loses \$435 annually in the cost of lost time and wasted fuel due to congestion. The average Springfield commuter loses 19 hours each year in traffic.

- According to TTI, the average driver in the St. Louis urban area loses \$686 each year in the cost of lost time and wasted fuel as a result of traffic congestion. The average St. Louis commuter wastes 31 hours each year stuck in traffic.
- Increasing levels of congestion add significant costs to consumers, transportation companies, manufacturers, distributors and wholesalers and can reduce the attractiveness of a location to a company to consider expansion or even to locate a new facility. Congestion costs can also increase overall operating costs for trucking and shipping companies, leading to revenue losses, lower pay for drivers and employees, and higher consumer costs.

**The efficiency of Missouri’s transportation system, particularly its highways, is critical to the health of the state’s economy. Businesses are increasingly reliant on an efficient and dependable 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.**

- Annually, \$226 billion in goods are shipped from sites in Missouri and another \$234 billion in goods are shipped to sites in Missouri, mostly by truck.
- Seventy-two percent of the goods shipped annually from sites in Missouri are carried by trucks and another 16 percent are carried by courier services or multiple mode deliveries, which include trucking.
- 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.
- 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 two site selection factor behind only the availability of skilled labor in a 2013 survey of corporate executives by [Area Development Magazine](#).
- 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 is a critical source of funding for Missouri’s roads, highways and bridges and provides a significant return in road and bridge funding based on the revenue generated in the state by the federal motor fuel tax.**

- From 2009 to 2013, the federal government provided \$1.31 for road improvements in Missouri for every dollar the state paid in federal motor fuel fees.
- Signed into law in July 2012, MAP-21 (Moving Ahead for Progress in the 21<sup>st</sup> Century Act), has improved several procedures that in the past had delayed projects, MAP-21 does not address long-term funding challenges facing the federal surface transportation program.
- In July 2014 Congress approved the Highway and Transportation Funding Act of 2014, an eight-month extension of the federal surface transportation program, on which states rely for road, highway, bridge and transit funding. The program, initially set to expire on September 30, 2014, will now run through May 31, 2015. In addition to extending the current authorization of the highway and public transportation programs, the legislation transfers nearly \$11 billion into the Highway Trust Fund (HTF) to preserve existing levels of highway and public transportation investment through the end of May 2015.
- If Congress decides to provide additional revenues into the federal Highway Trust Fund in tandem with authorizing a new federal surface transportation program, a number of technically feasible revenue options have been identified by the [American Association of State Highway and Transportation Officials](#).
- A significant boost in investment on the nation's roads, highways, bridges and public transit systems is needed to improve their condition and to meet the nation's transportation needs, concluded a new report from the American Association of State Highway and Transportation Officials.
- The [2015 AASHTO Transportation Bottom Line Report](#) found that annual investment in the nation's roads, highways and bridges needs to increase from \$88 billion to \$120 billion and from \$17 billion to \$43 billion in the nation's public transit systems, to improve conditions and meet the nation's mobility needs.
- The [2015 AASHTO Transportation Bottom Line Report](#) also found that the current backlog in needed road, highway and bridge improvements is \$740 billion.

*Sources of information for this report include the Missouri Department of Transportation (MoDOT), Federal Highway Administration (FHWA), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the American Association of State Highway and Transportation Officials (AASHTO), the Texas Transportation Institute (TTI) and the National Highway Traffic Safety Administration (NHTSA).*

## **Introduction**

Missouri'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 Show Me State hoping to foster quality of life improvements and economic competitiveness, the modernization of Missouri's transportation system is crucial.

As the U.S. and Missouri work to achieve long-term economic growth, the preservation and modernization of the state's transportation system could play an important role in retaining Missouri's economic competitiveness and improving its 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 Missouri 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 state's residents and visitors continue to enjoy access to a safe and efficient transportation network. Meeting Missouri's need to modernize and maintain its system of roads, highways and bridges will require a significant boost in local, state and federal funding.

Signed into law in July 2012, MAP-21 (Moving Ahead for Progress in the 21<sup>st</sup> Century Act), has improved several procedures that in the past had delayed projects. MAP-21 does not address long-term funding challenges facing the federal surface transportation program. In July 2014, Congress approved the Highway and Transportation Funding Act of 2014, an eight-month extension of the federal surface transportation program on which states rely for road, highway, bridge and transit funding. The program, initially set to expire on September 30, 2014, now runs through May 31, 2015. In addition to extending the current authorization of the highway and

public transportation programs, the legislation transfers nearly \$11 billion into the Highway Trust Fund (HTF) to preserve existing levels of highway and public transportation investment through the end of May 2015.

Congress will need to pass new legislation prior to the May 31, 2015 extension expiration to ensure prompt federal reimbursements to states for road, highway, bridge and transit repairs and improvements.

The level of funding and the provisions of the federal surface transportation program have a significant impact on highway and bridge conditions, roadway safety, transit service, quality of life and economic development opportunities in all of the states.

This report examines the condition, use and safety of Missouri's roads, highways and bridges, federal, state and local funding needs, and the future mobility needs of the state. Sources of information for this study include the Missouri Department of Transportation (MoDOT), the Federal Highway Administration (FHWA), the U.S. Census Bureau, the American Association of State Highway and Transportation Officials (AASHTO), the Texas Transportation Institute (TTI), the Bureau of Transportation Statistics (BTS), and the National Highway Traffic Safety Administration (NHTSA).

## **Population, Travel and Economic Trends in Missouri**

Missouri 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 quality of life and spur economic growth in Missouri, 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.

Missouri's population grew to approximately 6.1 million residents in 2013, an 18 percent increase since 1990.<sup>1</sup> Missouri had 4,280,438 licensed drivers in 2013.<sup>2</sup> From 1990 to 2013, Missouri's gross domestic product (GDP), a measure of the state's economic output, increased by 49 percent, when adjusted for inflation.<sup>3</sup>

From 1990 to 2013, annual VMT in Missouri increased by 37 percent, from 50.9 billion miles traveled annually to 69.5 billion miles traveled annually.<sup>4</sup> Based on population and other lifestyle trends, TRIP estimates that travel on Missouri's roads and highways will increase by another 20 percent by 2030.<sup>5</sup>

## **Condition of Missouri's Roads**

The life cycle of Missouri's roads is greatly affected by the state and local government's ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible.

Twenty-two percent of Missouri's major roads and highways have pavements rated in poor condition.<sup>6</sup> Another 48 percent of Missouri's major roads are rated in mediocre or fair condition and the remaining 30 percent are rated in good condition.<sup>7</sup>

The chart below details pavement conditions on major urban roads in Jefferson City, Kansas City, Springfield and St. Louis.<sup>8</sup>

**Chart 1. Pavement conditions on major urban roads.**

<b>Location</b>	<b>Poor</b>	<b>Mediocre</b>	<b>Fair</b>	<b>Good</b>
Jefferson City	32%	34%	12%	22%
Kansas City	23%	32%	15%	30%
Springfield	19%	25%	16%	41%
St. Louis	29%	28%	12%	31%

**Source: Federal Highway Administration.**

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 Missouri Department of Transportation (MoDOT) on the condition of major state and locally maintained roads and highways in the state.

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.<sup>9</sup> 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.

### **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 Missouri motorists as a result of poor road conditions is \$1.7 billion annually.<sup>10</sup>

The chart below details per-driver vehicle operating costs in Jefferson City, Kansas City, Springfield, St. Louis and statewide.

**Chart 2. Vehicle operating costs due to rough roads.**

<b>Location</b>	<b>VOC</b>
Jefferson City	\$685
Kansas City	\$545
Springfield	\$455
St. Louis	\$596
<b>Missouri - Statewide</b>	<b>\$1.7 Billion</b>

**Source: TRIP estimate.**

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.<sup>11</sup>

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 2014 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.<sup>12</sup> 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 Missouri**

Missouri'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-three percent of Missouri's locally and state-maintained bridges (20 feet or longer) are currently rated as structurally deficient or functionally obsolete.

Thirteen percent of Missouri's locally and state-maintained bridges are rated as structurally deficient.<sup>13</sup> 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.

Ten percent of Missouri’s locally and state maintained bridges are rated functionally obsolete.<sup>14</sup> 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 Safety in Missouri**

A total of 4,068 people were killed in motor vehicle crashes in Missouri from 2009 through 2013, an average of 814 fatalities per year.<sup>15</sup>

**Chart 3. Traffic fatalities in Missouri from 2009 – 2013.**

<i>Year</i>	<i>Fatalities</i>
2009	878
2010	821
2011	786
2012	826
2013	757
<b>Total</b>	<b>4,068</b>

**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.

Missouri's overall traffic fatality rate of 1.09 fatalities per 100 million vehicle miles of travel in 2013 is the same as the national average.<sup>16</sup> The fatality rate on Missouri's non-Interstate rural roads was 1.96 fatalities per 100 million vehicle miles of travel in 2013, nearly three times the fatality rate of 0.68 on all other roads and highways in the state.<sup>17</sup>

Improving safety on Missouri'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 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.<sup>18</sup>

## Traffic Congestion in Missouri

Increasing levels of traffic congestion cause significant delays in Missouri, particularly in its larger urban areas, choking commuting and commerce. 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.

Based on methodology developed by the Texas Transportation Institute (TTI), TRIP estimates that the average Jefferson City driver loses \$410 annually in the cost of lost time and wasted fuel due to congestion.<sup>19</sup> The average Jefferson City commuter loses 18 hours each year in traffic.<sup>20</sup>

According to the Texas Transportation Institute, the average driver in the Kansas City urban area loses \$584 each year in the cost of lost time and wasted fuel as a result of traffic congestion.<sup>21</sup> The average commuter in the Kansas City urban area wastes 27 hours each year stuck in traffic.<sup>22</sup>

Based on TTI methodology, TRIP estimates that the average Springfield driver loses \$435 annually in the cost of lost time and wasted fuel due to congestion.<sup>23</sup> The average Springfield commuter loses 19 hours each year in traffic.<sup>24</sup>

TTI estimates that the average driver in the St. Louis urban area loses \$686 each year in the cost of lost time and wasted fuel as a result of traffic congestion.<sup>25</sup> The average St. Louis commuter wastes 31 hours each year stuck in traffic.<sup>26</sup>

The increasing levels of congestion add significant costs to consumers, transportation companies, manufacturers, distributors and wholesalers. The increased levels of congestion can reduce the attractiveness of a location to a company to consider expansion or even to locate a

new facility. Congestion costs can also increase overall operating costs for trucking and shipping companies, leading to revenue losses, lower pay for employees, and higher consumer costs.

## **Transportation Funding**

Investment in Missouri'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 May 31, 2015.

The federal government is a critical source of funding for Missouri's roads, highways, bridges and transit systems and provides a significant return to Missouri in road and bridge funding based on the revenue generated in the state by the federal motor fuel tax. From 2009 to 2013, the federal government provided \$1.31 for road improvements in Missouri for every dollar that motorists in the state paid in federal motor fuel fees.<sup>27</sup>

Federal funds for highway and transit improvements in Missouri are provided through the federal Highway Trust Fund (HTF), which raises revenue through federal user fees, largely an 18.4 cents-per-gallon tax on gasoline and a 24.4 cents-per-gallon tax on diesel fuel. Since 2008 revenue into the federal Highway Trust Fund has been inadequate to support legislatively set funding levels so Congress has transferred approximately \$53 billion in general funds and an additional \$2 billion from a related trust fund into the federal Highway Trust Fund.<sup>28</sup>

Signed into law in July 2012, MAP-21 has improved several procedures that in the past had delayed projects. MAP-21 does not address long-term funding challenges facing the federal surface transportation program. In July 2014 Congress approved the Highway and Transportation

Funding Act of 2014, an eight-month extension of the federal surface transportation program on which states rely for road, highway, bridge and transit funding. The program, initially set to expire on September 30, 2014, will now run through May 31, 2015. In addition to extending the current authorization of the highway and public transportation programs, the legislation transfers nearly \$11 billion into the Highway Trust Fund to preserve existing levels of highway and public transportation investment through the end of May 2015.

If Congress decides to provide additional revenues into the federal Highway Trust Fund in tandem with authorizing a new federal surface transportation program, a number of technically feasible revenue options have been identified by the [American Association of State Highway and Transportation Officials](#).

A significant boost in investment on the nation's roads, highways, bridges and public transit systems is needed to improve their condition and to meet the nation's transportation needs, concluded a new report from the American Association of State Highway and Transportation Officials.

The [2015 AASHTO Transportation Bottom Line Report](#) found that annual investment in the nation's roads, highways and bridges needs to increase from \$88 billion to \$120 billion and from \$17 billion to \$43 billion in the nation's public transit systems, to improve conditions and meet the nation's mobility needs.<sup>29</sup>

The [2015 AASHTO Transportation Bottom Line Report](#) also found that the current backlog in needed road, highway and bridge improvements is \$740 billion.<sup>30</sup> The backlog includes a \$392 billion backlog for road and highway rehabilitation, a \$112 billion backlog in needed bridge rehabilitation and a \$237 billion backlog in needed highway capacity additions.<sup>31</sup>

## **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. 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.

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 e-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 Missouri, particularly to the state's manufacturing, mineral extraction and tourism industries. 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.

Every year, \$226 billion in goods are shipped from sites in Missouri and another \$234 billion in goods are shipped to sites in Missouri, mostly by trucks.<sup>32</sup> Seventy-two percent of the goods shipped annually from sites in Missouri are carried by trucks and another 16 percent are carried by courier services or multiple-mode deliveries, which include trucking.<sup>33</sup>

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.<sup>34</sup>

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. In fact, highway accessibility was ranked the number two site selection factor behind only the availability of skilled labor in a 2013 survey of corporate executives by [Area Development Magazine](#).<sup>35</sup>

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 Missouri looks to build and enhance a thriving, growing and dynamic state, it will be critical that it is able to provide a 21<sup>st</sup> century network of roads, highways and bridges that can accommodate the mobility demands of a modern society.

As the nation looks to fully rebound from the recession, 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 Missouri'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 Missouri'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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- <sup>1</sup> U.S. Census Bureau (2014).
- <sup>2</sup> Highway Statistics (2013). Federal Highway Administration. DL-1C
- <sup>3</sup> TRIP analysis of Bureau of Economic Analysis data.
- <sup>4</sup> U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 1990 and 2013.
- <sup>5</sup> TRIP calculation based on U.S. Census and Federal Highway Administration data.
- <sup>6</sup> Federal Highway Administration (2013). Pavement condition data is for 2012.
- <sup>7</sup> Ibid.
- <sup>8</sup> Federal Highway Administration (2014). Pavement condition data is for 2012.
- <sup>9</sup> Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.
- <sup>10</sup> TRIP calculation
- <sup>11</sup> Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.
- <sup>12</sup> Your Driving Costs. American Automobile Association. 2014.
- <sup>13</sup> MoDOT locally and state-maintained bridge data provided to TRIP (2015).
- <sup>14</sup> Ibid.
- <sup>15</sup> MoDOT safety data in response to TRIP survey (2015).
- <sup>16</sup> TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2014).
- <sup>17</sup> TRIP analysis of FHWA data (2015). Highway Statistics 2013, charts VM-2, FI-20.
- <sup>18</sup> Adding Highway Shoulders, Width, Reduce Crash Numbers and Save Lives (August 9, 2012). Texas Transportation Institute.
- <sup>19</sup> TRIP estimate based on Texas Transportation Institute methodology.
- <sup>20</sup> Ibid.
- <sup>21</sup> Texas Transportation Institute Urban Mobility Report, 2012.
- <sup>22</sup> Ibid.
- <sup>23</sup> TRIP estimate based on Texas Transportation Institute methodology.
- <sup>24</sup> Ibid.
- <sup>25</sup> Texas Transportation Institute Urban Mobility Report, 2012.
- <sup>26</sup> Ibid.
- <sup>27</sup> TRIP analysis of Federal Highway Administration data. 2009 to 2013 Highway Statistics fe-221.
- <sup>28</sup> "Surface Transportation Reauthorization and the Solvency of the Highway Trust Fund," presentation by Jim Tyson, American Association of State Highway and Transportation Officials (2014).
- <sup>29</sup> 2015 AASHTO Bottom Line Report (2014) AASHTO. P. 2.
- <sup>30</sup> 2015 AASHTO Bottom Line Report (2014) AASHTO. P. 3.
- <sup>31</sup> Ibid.
- <sup>32</sup> Bureau of Transportation Statistics (2010), U.S. Department of Transportation. 2007 Commodity Flow Survey, State Summaries. [http://www.bts.gov/publications/commodity\\_flow\\_survey/2007/states/](http://www.bts.gov/publications/commodity_flow_survey/2007/states/)
- <sup>33</sup> Ibid.
- <sup>34</sup> 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.
- <sup>35</sup> Area Development Magazine (2014). 28th Annual Survey of Corporate Executives: Availability of Skilled Labor New Top Priority. . <http://www.areadevelopment.com/Corporate-Consultants-Survey-Results/Q1-2014/28th-Corporate-Executive-RE-survey-results-6574981.shtml?Page=2>