

MAKING THE GRADE IN ALABAMA:

An Analysis of the Ability of Alabama's Transportation System
to Meet the State's Need for Safe and Efficient Mobility

JANUARY 2009

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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 highway transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway engineering, construction and finance; labor unions; and organizations concerned with an efficient and safe highway transportation network.

Executive Summary

Alabama's extensive system of roads and bridges provides the state's 4.6 million residents and its visitors with a high level of mobility. The state's extensive highway transportation system enables residents and visitors to go to work, visit family and friends, move goods to market, and frequent tourist attractions.

It is critical that Alabama develop and maintain a modern transportation system that can accommodate future growth in population, vehicle travel and economic development. And as the nation looks to rebound from the current 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 Alabama's roads, highways, bridges and public transit systems 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.

This report looks at the condition, traffic congestion levels, traffic safety rates and the unmet funding needs of major roads and highways in Alabama. The deficiencies cited in this report are not a reflection of the effectiveness of state and local transportation agencies, but of a lack of adequate funding.

Sources of information for this study include the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Texas Transportation Institute (TTI) and the Alabama Department of Transportation.

ROAD CONDITIONS

Thirteen percent of the state's major roads and highways have pavements in poor or mediocre condition.

- Five percent of Alabama's major roads are rated in poor condition, and an additional eight percent are in mediocre condition. This includes Interstates, highways, connecting urban arterials, and key urban streets that are maintained by state, county or municipal governments.
- 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 Alabama's motorists \$601 million – \$165 per driver – annually in extra vehicle operating costs, including accelerated vehicle depreciation, additional repair costs and increased fuel consumption and tire wear.

BRIDGE CONDITIONS

Approximately a quarter of Alabama's bridges are structurally deficient or functionally obsolete. This includes all state, local and municipal bridges 20 feet and longer.

- Eleven (11.2) percent of Alabama's bridges are rated as structurally deficient, showing significant deterioration to decks and other major components.
- Thirteen (13.5) percent of Alabama's bridges are functionally obsolete. These bridges no longer meet modern design standards for safety features such as lane widths or alignment with connecting roads or are no longer adequate for the volume of traffic being carried.
- Bridge deficiencies have an impact on mobility and safety. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid these bridges. Narrow bridge lanes, inadequate clearances and poorly aligned bridge approaches reduce traffic safety. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.

CONGESTION

Increases in population and vehicle travel in Alabama have led to additional traffic congestion in the state's urban areas.

- Alabama's population increased 15 percent from 1990 to 2007, from 4 million to 4.6 million residents. Alabama's population is expected to increase by another 15 percent by 2025.
- Vehicle travel on Alabama's major highways increased 45 percent between 1990 and 2007, rising from 42.3 billion vehicle miles traveled in 1990 to 61 billion vehicle miles traveled in 2007.
- Vehicle travel in the state is expected to increase by 45 percent by 2025.
- Fifty-two percent of Alabama's urban Interstates and other highways or freeways are considered congested, because they carry a level of traffic that is likely to result in delays during peak travel hours.
- From 1990 to 2007, lane miles of Interstates, freeways and expressways increased in Alabama by six percent. However, during that same time, vehicle travel on those roads increased by 70 percent. Thus, from 1990 to 2007, vehicle travel on Alabama's key urban roads increased by a rate nearly 12 times greater than new highway lane capacity was added.

SAFETY

On average, 1,106 people were killed each year in crashes on Alabama's roads from 2002 to 2006. Alabama's traffic fatality rate in 2006 was 42 percent higher than the national average. Improving safety features on Alabama's roads and highways would likely result in a decrease in traffic fatalities in the state. Roadway design is an important factor in approximately one-third of fatal and serious traffic accidents.

- A total of 5,532 people were killed in Alabama in traffic accidents from 2002 to 2006.
- Alabama's traffic fatality rate in 2006 (the latest year for which data is available) was 2.0 fatalities per 100 million vehicle miles of travel, 42 percent higher than the national traffic fatality rate of 1.41.
- Highway improvements such as removing or shielding obstacles, adding or improving medians, adding rumble strips, widening lanes, widening and paving shoulders, upgrading roads from two lanes to four lanes and installing better road markings and traffic signals, where appropriate, can reduce traffic fatalities and accidents while improving traffic flow to help relieve congestion.

- 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.

FUNDING

Alabama faces a transportation funding shortfall of approximately \$6.9 billion from 2008 to 2017. As a result, needed highway projects will not be able to move forward without additional funding. Investment in the state's roads, highways and bridges creates significant employment in the state.

- The Alabama Department of Transportation (ALDOT) projects a funding shortfall of \$6.9 billion from 2008 to 2017.
- ALDOT estimates that from 2008 to 2017, approximately \$16.2 billion is needed to allow the state to significantly improve road and bridge conditions, make reasonable roadway safety improvements and address needed traffic congestion relief.
- According to ALDOT estimates, anticipated funding levels from 2008 to 2017 will be only \$9.3 billion. As a result, needed highway improvement and maintenance projects will not be able to move forward without additional transportation funding.
- 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.

Introduction

Alabama's system of roads and bridges provides the state's 4.6 million residents and its visitors with a high level of mobility. As the backbone of Alabama's surface transportation system, roads and bridges play a central role in the state's economy and enable residents and visitors to go to work, visit family and friends, move goods to market, and frequent tourist attractions.

The continued modernization of Alabama's roads, bridges and public transit systems is crucial to providing a safer, more efficient transportation system, while improving the economic livelihood of the state and accommodating future growth. Projects designed to improve traffic and commuting flow and to make driving safer and more efficient, ultimately improve a state's level of mobility. As travel on Alabama's surface transportation system becomes more efficient, personal and commercial productivity will increase, boosting economic development statewide.

As the nation continues to experience a significant economic downturn, the modernization of Alabama's transportation system could play an important role in improving the state's economic wellbeing 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.

Alabama's extensive highway transportation system is maintained by state, local and municipal agencies. The deficiencies cited in this report are not a reflection of the effectiveness of state and local transportation agencies, but of a lack of adequate funding.

This report looks at the condition, use, safety and funding of Alabama's roads and bridges, as well as the state's ability to meet future mobility and traffic safety needs. Sources of information for this study include the U.S. Department of Transportation (USDOT), the Federal

Highway Administration (FHWA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Texas Transportation Institute (TTI), and the Alabama Department of Transportation (ALDOT).

Population and Travel Trends in Alabama

Alabama residents enjoy modern lifestyles that rely on a high level of personal and commercial mobility. Significant increases in both the state's population and the rate of travel of its residents have created a tremendous increase in the demand placed on Alabama's transportation system, particularly its key highways and roads. It is critical that Alabama develop and maintain a modern transportation system that can accommodate future growth in population, vehicle travel and economic development.

Alabama's population reached 4.6 million in 2007, increasing 15 percent since 1990, when the state's population was approximately 4 million.¹ Alabama's population is expected to increase another 15 percent by 2025.²

Significant population and economic growth in Alabama have resulted in a corresponding increase in vehicle travel in the state. From 1990 to 2007 (the latest year for which data is available), annual vehicle miles of travel (VMT) in Alabama increased by 45 percent, from 42.3 billion annual VMT to 61 billion VMT.³

Vehicle travel in Alabama is expected to increase by 45 percent by 2025 to approximately 89 billion annual VMT.⁴

Condition of Alabama's Roads

The life cycle of Alabama'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. The pavement condition of the state's major roads are evaluated and classified as being in poor, mediocre, fair or 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.⁵

In 2006, the latest year for which data is available, five percent of Alabama's major roads were rated in poor condition and an additional eight percent were in mediocre condition.⁶ Roads rated in poor condition often have significant rutting, potholes or other visible signs of deterioration. Roads in poor condition 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 Alabama's motorists \$601 million – \$165 per driver – annually in extra vehicle operating costs, including accelerated vehicle depreciation, additional repair costs and increased fuel consumption and tire wear. 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.⁷

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 vehicle operating cost estimates and then using the HDM model to estimate the additional vehicle operating costs being paid by drivers as a result of substandard roads.⁸ Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into the TRIP vehicle operating cost methodology.

Bridge Conditions in Alabama

Alabama's bridges 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.

In 2008, 25 percent of Alabama's bridges were rated deficient, either because they were structurally deficient or functionally obsolete. Eleven (11.2) percent of the state's bridges (20 feet or longer) were rated structurally deficient.⁹ 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.

Approximately 13 (13.5) percent of Alabama’s bridges (20 feet or longer) were rated as functionally obsolete in 2008.¹⁰ Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

Chart 1. Bridge Conditions in Alabama

BRIDGE CONDITION	NUMBER OF BRIDGES	PERCENTAGE OF BRIDGES
Structurally Deficient	1,783	11.2%
Functionally Obsolete	2,144	13.5%
Total Deficient Bridges	3,927	24.7%
Total Number of Bridges	15,909	

Source: National Bridge Inventory

Traffic Safety in Alabama

On average, 1,106 people were killed each year in motor vehicle accidents in Alabama from 2002 through 2006, according to the National Highway Transportation Safety Administration.¹¹ Alabama had a traffic fatality rate of 2.0 fatalities per 100 million vehicle miles of travel in 2006 (the latest year for which data is available), which is 42 percent higher than the national traffic fatality rate of 1.41, and the ninth highest in the nation.

Chart 2. Traffic fatalities in Alabama from 2002 – 2006

Year	Fatalities
2002	1,038
2003	1,001
2004	1,154
2005	1,131
2006	1,208

Source: National Highway Traffic Safety Administration.

The three major factors associated with fatal vehicle accidents are: driver behavior, vehicle characteristics and roadway design. It is estimated that roadway design is an important factor in one-third of fatal and serious traffic accidents. Improving safety on Alabama’s roads and highway system 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. 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, where appropriate, could reduce the severity and occurrences of serious traffic crashes. 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.¹²

Roads with poor geometry, 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.

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

Chart 3. Reduction in fatal accident rates after roadway improvements¹³

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

Traffic Congestion in Alabama

Traffic congestion in Alabama is a growing burden in key urban areas and threatens to impede the state's economic development by reducing the reliability of freight transportation in the state. Congestion on Alabama's urban highways is growing as a result of increases in vehicle travel and population, without a corresponding increase in highway capacity or efficiency.

In 2007, the latest year for which data is available, 52 percent of Alabama's urban highways were congested, carrying traffic volumes that result in significant rush hour delays.¹⁴

These routes are considered congested because the levels of traffic they carry are likely to cause delays during peak travel hours. Highways that carry high levels of traffic are also more vulnerable to experiencing significant traffic delays as a result of traffic accidents or other incidents.

From 1990 to 2007, lane miles of Alabama's Interstates, freeways and expressways increased by six percent. However, during that same time, vehicle travel on those roads increased by 70 percent. Thus, from 1990 to 2007, vehicle travel in Alabama increased at a rate nearly 12 times greater than new highway lane capacity was added.¹⁵

Funding

Alabama faces a transportation funding shortfall of approximately \$6.9 billion from 2008 to 2017. According to the Alabama Department of Transportation, from 2008 to 2017, approximately \$16.2 billion is needed to allow the state to significantly improve road and bridge conditions, make reasonable roadway safety improvements and address needed traffic congestion relief. However, ALDOT estimates that anticipated funding levels during this time period will be only \$9.3 billion.¹⁶

As a result, needed highway improvement projects can not move forward without additional funding.¹⁷ 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.¹⁸

Conclusion

It is critical that Alabama develop and maintain a modern transportation system that can accommodate the state's growth in population, vehicle travel and economic development. Further modernization of Alabama's system of roads, bridges and public transit is crucial to

providing a safer, more efficient transportation system, while improving the quality of life and economic livelihood of the state. Projects designed to improve traffic flow, make driving safer, and help the state accommodate increasing levels of vehicle travel ultimately improve the state's level of mobility. As travel on Alabama's surface transportation system becomes more efficient, personal and commercial productivity will increase, boosting economic development and quality of life statewide.

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Endnotes

¹ U.S. Census data.

² Ibid

³ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2004.

⁴ TRIP estimate based on analysis of FHWA data.

⁵ Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.

⁶ TRIP analysis of U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2004.

⁷ Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.

⁸ Your Driving Costs. American Automobile Association, 2006.

⁹ Federal Highway Administration –2008 National Bridge Inventory.

¹⁰ Ibid.

¹¹ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 1999-2004
www.fhwa.dot.gov and www-fars.nhtsa.dot.gov.

¹² Highway Safety Evaluation System, 1996 Annual Report on Highway Safety Improvement Programs, U.S. Department of Transportation.

¹³ Highway Safety Evaluation System; 1996 Annual Report on Highway Safety Improvement Programs; U.S. Department of Transportation.

¹⁴ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2006

¹⁵ Federal Highway Administration, Highway Statistics, 1990 and 2007. Charts HM-60 and VM-2.

¹⁶ Ibid.

¹⁷ Alabama Department of Transportation. Response to information requested in TRIP survey.

¹⁸ Federal Highway Administration, 2008. Employment Impacts of Highway Infrastructure Investment.