

Getting Home Safely:

An Analysis of Highway Safety in Arkansas

February 2007

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Executive Summary

Arkansas' 2.8 million residents and its visitors depend on a safe and efficient transportation system to provide them with a high level of personal and commercial mobility, which enhances the quality of life in the state and supports Arkansas' growing economy. But travel on the state's deteriorated roads and bridges continues to result in an unacceptable rate of fatal and serious traffic crashes.

This report looks at the causes of traffic fatalities and serious crashes in Arkansas, analyzes vehicle travel and traffic safety trends statewide and concludes with recommendations about how traffic safety can be improved for Arkansas' motorists. Traffic safety data in this report is reported by the most recent year for which data is available.

The following are the most critical findings of the report:

Arkansas' traffic fatality rate is the ninth highest in the nation. An average of 646 fatalities occur on Arkansas' roads each year. Studies have shown that roadway design is an important factor in approximately one-third of all fatal crashes.

- There were 2.03 traffic fatalities per 100 million vehicle miles of travel in Arkansas during 2005, the ninth highest traffic fatality rate in the nation. Arkansas' traffic fatality rate per 100 million vehicle miles of travel is 40 percent higher than the national average of 1.45 traffic fatalities.
- Traffic crashes are a major source of fatalities in Arkansas, with 3,230 people killed on the state's roads between 2001 and 2005, an average of 646 fatalities per year.
- The majority of people (94 percent) killed in traffic crashes in Arkansas from 2001 to 2005 were occupants of vehicles. During that same time, six percent of those killed were pedestrians or bicyclists.
- Several key factors that contribute to fatal and serious traffic crashes in Arkansas include the safety design of the actual roadway, human behavior (speeding, drug and alcohol use, safety belt use, drowsiness or distraction), the safety features of the vehicle and the medical care of the victims.
- The design of a roadway has been found to be an important factor in approximately one third of all fatal traffic crashes. Roadway safety factors that have a significant impact on traffic safety include lane widths, the angle of curves, the number of lanes and the presence or absence of roadway safety features such as adequate shoulders, rumble strips, guard rails, turn lanes, adequate lighting and signage, shielded or removed roadside obstacles, and median barriers.

Traffic crashes take a tremendous economic toll on a community, in addition to the suffering and grief that they cause to those injured or killed and their loved ones.

- The National Highway Traffic Safety Administration (NHTSA) estimates that in 2005, the economic cost of vehicle crashes in Arkansas was \$2 billion, which is \$723 per person in the state. These costs include medical costs, lost economic and household productivity, psychological or emotional trauma, property damage and travel delays.

The traffic fatality rate on Arkansas' rural, non-Interstate roads is nearly two and a half times higher than on the state's other roads. The high rate of traffic fatalities on Arkansas' rural, non-Interstate roads is a result of inadequate roadway safety design, higher speeds traveled on rural roads and longer emergency response times in rural areas.

- The traffic fatality rate in 2005 on Arkansas' non-Interstate rural roads was 2.94 traffic fatalities per 100 million vehicle miles of travel, which is more than two and a half times higher than the traffic fatality rate on all other roads and highways in the state (1.18).
- More than two-thirds – 69 percent – of all traffic fatalities in Arkansas in 2005 occurred on rural non-Interstate roads, higher than the national average of 47 percent.
- Approximately 48 percent of travel in Arkansas takes place on non-Interstate rural roads, while the national average is 26 percent.
- Rural roads are more likely than urban roads to have only two lanes, have narrow lanes, limited shoulders, excessive curves and steep slopes alongside roadways. In many cases, these are makeshift roads that have been updated or converted over the years to State Highway standards, with little consistency in design features.

Arkansas has experienced steady population growth in recent years, which, combined with a regular influx of tourists and other visitors, has resulted in a significant increase in annual vehicle travel.

- Arkansas' population reached 2.8 million people in 2005, an increase of 18 percent since 1990.
- Annual vehicle miles of travel increased by 48 percent from 1990 to 2005, from 21 billion vehicle miles of travel annually to 31.2 billion.

There are numerous roadway safety improvements that can be made to reduce serious crashes and traffic fatalities. These improvements are designed largely to keep vehicles from leaving their designated lane and to minimize the consequences if a vehicle does leave it's lane.

- The type of safety design improvement that is appropriate for a section of road will depend partly on the amount of funding available and the nature of the safety problem on that section of road.

- *Low cost safety improvements* include rumble strips, centerline rumble strips, improving signage and pavement/lane markings, installing lighting, removing or shielding roadside obstacles, the use of chevrons and post-mounted delineators along curves, and upgrading or adding guardrails.
- *Moderate-cost improvements* include adding or paving shoulders, resurfacing pavements and adding median barriers.
- *Moderate to high-cost improvements* include improving roadway alignment, reducing the angle of curves, widening lanes and adding intermittent passing lanes or adding a third or fourth lane.

Sources of information for this report include the Arkansas Department of Transportation, the Federal Highway Administration, the National Highway Traffic Safety Administration, and the U.S. Department of Transportation.

Introduction

Whether people are traveling to work, school, shopping or visiting friends, getting home safely is the most important consideration. And with travel continuing to increase in Arkansas, it is important that every practical step is taken to minimize the likelihood of traffic crashes that can result in serious injuries and deaths.

This report looks at recent trends in highway safety in Arkansas and recommends steps that can be taken to further improve highway safety in Arkansas.

Trends in Population and Travel Growth in Arkansas

Arkansas residents enjoy modern lifestyles that rely on a high level of personal and commercial mobility. Significant increases have occurred in the state's population and the rate of travel of its residents in recent years. Arkansas' population reached 2.8 million people in 2005, an increase of 18 percent since 1990.¹ Similarly, from 1990 to 2005, vehicle miles of travel in Arkansas increased by 52 percent, from 21 billion vehicle miles of travel annually to 31.9 billion.

Traffic Fatalities in Arkansas

There are several key factors that contribute to fatal and serious traffic crashes in Arkansas. These factors include human behavior, the safety features of the vehicle, the medical care of the victims and the safety design of the actual roadway.² The design of a roadway has been found to be an important factor in approximately one third of all fatal traffic crashes. Roadway safety factors that have a significant impact on traffic safety include lane widths, the angle of curves, the number of lanes and the presence or absence of roadway safety features such as adequate

shoulders, rumble strips, guard rails, turn lanes, adequate lighting and signage, shielded or removed roadside obstacles, and median barriers. Human behavioral issues include whether safety belts are used, whether a driver is impaired by alcohol or drugs, whether a driver is distracted or drowsy or whether a driver is speeding.

Traffic crashes are a major source of fatalities in Arkansas, with an average of 646 people killed annually in highway vehicle crashes over the last five years (2001-2005). During the 2001 to 2005 period, 3,230 people were killed in traffic crashes in Arkansas.³

Chart 1. Annual traffic fatalities in Arkansas from 2001 to 2005

YEAR	FATALITIES
2001	611
2002	640
2003	627
2004	704
2005	648

Source: TRIP analysis of National Highway Traffic Safety Administration data

There were 2.03 traffic fatalities per 100 million miles of travel in Arkansas during 2005, 40 percent higher than the national average of 1.45 traffic fatalities per every 100 million vehicle miles of travel.⁴ Arkansas' traffic fatality rate is the eighth highest in the nation.

Traffic crashes take a tremendous economic toll on a community, in addition to the suffering and grief that they cause to those injured or killed and their loved one. The National Highway

Traffic Safety Administration (NHTSA) estimates annually the total economic costs of motor vehicle crashes in each state. In 2005, NHTSA estimates that the cost of vehicle crashes in Arkansas was approximately \$2 billion, which is \$723 per person.⁵ These costs include medical costs, lost economic and household productivity, psychological or emotional trauma, property damage and travel delays.

Ninety-four percent of those killed in traffic crashes in Arkansas from 2001 to 2005 were occupants of vehicles; six percent of those killed in traffic crashes were pedestrians or bicyclists.⁶

Rural Traffic Safety

Arkansas' rural, non-Interstate roads have a significantly higher fatality rate than other roads in the state. The traffic fatality rate in 2005 on Arkansas' non-Interstate rural roads was 2.94 traffic fatalities per 100 million vehicle miles of travel, which is more than two and a half times higher than the traffic fatality rate on all other roads and highways in the state (1.18).⁷ The national traffic fatality rate on rural-non-Interstate routes in 2005 was 2.61 and on all other roads nationally, the rate of traffic fatalities per 100 million VMT was 0.95.⁸

A disproportionately high share of highway fatalities occur on Arkansas' rural, non-Interstate roads. In 2005, 48 percent of vehicle travel in Arkansas occurred on rural, non-Interstate roads, compared to a national average of 26 percent.⁹ In 2005, 69 percent of traffic fatalities in Arkansas occurred on rural, non-Interstate routes, compared to a national average of 47 percent.¹⁰

There are several reasons that traffic fatality rates on rural, non-Interstate routes are higher than all other routes. These reasons include higher speeds traveled on rural roads, longer emergency vehicle response times in rural areas and inadequate roadway safety design on rural roads. Because rural roads have fewer intersections than urban roads and are more likely to provide travel between urban areas, they often have higher speed limits than many urban routes. Rural traffic crashes often occur in more remote locations than urban crashes. As a result, emergency medical care following a serious crash is often slower, contributing to a higher traffic fatality rate on rural roads.

Traffic fatality rates on rural roads are also higher than on urban roads, partly because rural roads are less likely to have adequate safety features and are more likely than urban roads to have two-lanes.

Rural routes have often been constructed over a period of years and as a result, often have inconsistent design features for such things as lane widths, curves, shoulders and clearance zones along roadways.¹¹ Many rural roads have been built with narrow lanes, limited shoulders and excessive curves and steep slopes alongside roadways.¹² In many cases, these are makeshift roads that have been updated or converted over the years to State Highway standards, with little consistency in design features.

Making Roads Safer

A variety of design improvements can help improve road safety. These improvements have as a goal keeping vehicles in the correct lane and minimizing the consequences of vehicles leaving the roadway.

The type of safety design improvement that is appropriate for a section of road or highway will depend partly on the amount of funding available and the nature of the safety problem on that section of road. Several studies have classified roadway safety improvements by both their effectiveness and their cost. These improvements include:

Low cost:

Rumble strips – Rumble strips have been found to reduce run off the road crashes by between 25 to 43 percent.¹³ Rumble strips are raised or grooved patterns constructed on the roadway's shoulder.

Centerline rumble strips – Several states have started to install centerline rumble strips to alert drivers who may be encroaching or have strayed into an opposing lane.

Improved signage and pavement markings – Traffic signs and pavement markings represent the first line of crucial information for drivers and can help improve night-time visibility. Signs with greater retro-reflectivity, more visible pavement markings and raised, reflective lane markings can all help drivers stay on a roadway, particularly at night.

Install lighting – A recent study of the addition of street lighting at 49 isolated rural intersections in Minnesota found that nighttime crashes decreased by 35 percent after the addition of lighting.¹⁴

Removing or shielding road-side obstacles – Trees, large rocks, utility poles, heavy mail boxes and other road-side objects can be shielded, moved or moved back to reduce the likelihood of a vehicle leaving the roadway striking these objects.

Upgrade or add guardrails – Adding or improving guardrails has been found to reduce traffic fatality rates by between 50-58 percent.¹⁵

Chevrons and post-mounted delineators along curves – The use of chevrons or post-mounted delineators have been found to be effective in reducing crashes at curves by providing drivers with better visual cues about the presence and geometry of a curve.¹⁶

Moderate cost:

Install median barriers – Median barriers have been found to reduce traffic fatality rates by 65 percent.¹⁷

Adding turn lanes at intersections – The addition of left turn lanes at rural intersections, where necessary, has been found to reduce crashes by between 33 and 48 percent.¹⁸ The addition of right turn lanes at intersections, where necessary, has been found to reduce crashes by between eight and 26 percent.¹⁹

Resurfacing pavements - Resurfaced pavements have been found to result in a 25 percent reduction in fatal crashes.²⁰

Moderate to high cost:

Add or pave shoulders – Paving or widening shoulders has been found to reduce traffic fatality rates by 10 to 35 percent, depending on the width of the widening and the location.²¹

Improved roadway alignment – Realigning roadways has been found to average a 50 percent reduction in traffic fatality rates.²²

Construct intermittent passing lanes or two-way left-turn lane – Adding passing lanes has been found to reduce traffic fatality rates by 20 percent and the addition of a two-way left-turn lane has been found to reduce traffic fatality rates by 30 percent.²³

Widen lanes – Making lanes wider has been found to reduce traffic fatality rates by eight to 10 percent.²⁴

Add lanes – A recent report on the likely safety benefit of converting two-lane rural roads into four-lane routes, found that traffic crash rates would be reduced by 40 to 60 percent.

Efforts to Improve Traffic Safety in Other States

Numerous states are taking significant steps to try to reduce traffic fatalities. States are becoming more aggressive at gathering data on fatal traffic crashes to allow them to identify high crash locations and corridors and to determine which traffic safety improvements would be the most useful. State and local governments lack adequate funds to pay for many needed highway safety improvements, but are trying to spend their limited highway traffic safety money where and how it will provide the greatest increase in traffic safety. Some of the states that are taking significant steps to reduce rural, fatal traffic crashes include the following:

California: The California Highway Patrol is leading a task force to examine the safety of all state corridors and to identify the most high-risk corridors. The task force will recommend behavioral and infrastructure improvements that are needed on these high-risk corridors to improve traffic safety. The California Department of Transportation also has formed a task force to identify locations where a high number of run-off-the-road crashes are occurring. About two-

thirds of these locations identified in 2004 were rural. The agency plans to use cost-effective strategies to improve traffic safety at these locations.²⁵

Georgia: Georgia is developing a plan to help reduce lane departure crashes. The plan calls for a combination of roadway design improvements, public education and enhanced law enforcement along key corridors. The state has begun adding shoulder rumble strips and centerline reflectors to help reduce run-off-the road crashes.²⁶

Mississippi: Mississippi has introduced a uniform crash reporting system to improve information on traffic crashes in the state and to help identify roadway sections most in need of safety improvements. The state is also testing various rumble strip patterns to determine which patterns would provide the greatest safety benefit, if introduced on numerous state roads.²⁷

Pennsylvania: Since 1997, Pennsylvania has been performing roadway safety audits along key stretches of state roads and highways to identify safety problems so that appropriate safety design improvements can be selected. The state has also installed 300 miles of centerline rumble strips to help warn drivers who have strayed into an oncoming lane.²⁸

Texas: In 2004, Texas identified 235 safety improvement projects that it planned to complete during the year. These projects include intersection beacon lights, widening lanes, adding rumble strips and removing trees near roads. Texas is assessing roadway safety needs along 30,000 miles of rural, two-lane roads, checking the appropriateness of speed limits, the condition of signs, and pavement markings and assessing pavement edge drop-offs or curve warnings. Based on these assessments, changes will be made to address the most important findings.²⁹

Conclusion

Arkansas motorists, businesses, and visitors depend on the state's system of roads and highways for safe and efficient travel. A variety of design improvements can help improve road safety. These improvements can help minimize the consequences of driver error and vehicles leaving the roadway. Additional funding is required to help modernize Arkansas' highway system and improve traffic safety statewide.

References

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³ TRIP analysis of National Highway Traffic Safety Administration (NHTSA) data; FHWA Highway Statistics 2003.

⁴ TRIP analysis of NHTSA data and estimate of 2004 VMT based on FHWA Highway Statistics trends.

⁵ TRIP analysis of 2003 NHTSA and FHWA data. Total cost of vehicle crashes is a NHTSA estimate. TRIP calculated per person cost.

⁶ TRIP analysis of 2000 to 2004 NHTSA data; Fatality Analysis Reporting System, <http://www-fars.nhtsa.dot.gov>.

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²¹ Ibid. 24.

²² Ibid. P. 25.

²³ Ibid. P. 24.

²⁴ Ibid. P. 25.

²⁵ United States General Accounting Office. Highway Safety: Federal and state efforts to Address Rural Road Safety Challenges (2004). P. 40.

²⁶ Ibid. P. 41.

²⁷ Safer Roadsides. Public Roads. U.S. Department of Transportation. January/February 2003. P. 15.

²⁸ United States General Accounting Office. Highway Safety: Federal and state efforts to Address Rural Road Safety Challenges (2004). P. 44.

²⁹ Ibid. P. 47.