



ADOT Bicycle Safety Action Plan

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Working Paper 2 – Goals and Emphasis Areas to Improve Bicyclist Safety in Arizona

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1 INTRODUCTION

1.1 Study Overview

According to the National Highway Traffic Safety Administration, in 2008, Arizona ranked 9th highest in the nation for bicyclist fatalities (2.92 fatalities per million residents), when 19 bicyclists were killed on Arizona's roadways. While this represents a significant reduction from 2005 levels, when 36 bicyclists were killed, it is still above the U.S. average of 2.32 fatalities per million residents. However, the share of bicyclist fatalities, as a percentage of total traffic fatalities, increased in 2008 from 2.0% to 3.1%, which is the highest it has been in the last nine years. Furthermore, the proportion of fatalities that involved bicyclists and pedestrians rose from 15.3% in 2008 to 18.2% in 2009, the highest level since 2001.

While more than 33,000 motorists, bicyclists, and pedestrians were killed nationally in 2009, the trend is in the right direction. The total number of traffic fatalities dropped 9.7% from 37,423 (2008) to 33,808 (2009), the lowest number of fatalities since 1950 (which had 33,186 fatalities). Bicyclist fatalities also dropped significantly (12%) between 2008 and 2009, from 718 bicyclists killed in 2008 to 630 bicyclists killed in 2009.

The purpose of this Arizona Department of Transportation (ADOT) Bicycle Safety Action Plan (BSAP) is to identify improvements, programs, and strategies that, upon their implementation, will reduce the frequency of bicyclist fatalities and injury crashes that occur on the State Highway System in Arizona. Implementation of this plan will allow progress to be measured over time. The improvements, programs and strategies will support the goal and objectives identified in this working paper.

A review of motor vehicle–bicycle crashes that occurred on state highways indicated that there were 1,089 bicycle-motor vehicle crashes reported on state highways between January 1, 2004 and December 31, 2008. **Figure 1** illustrates the injury severity of the crashes that were reported for both statewide and state highway motor vehicle-bicycle crashes.

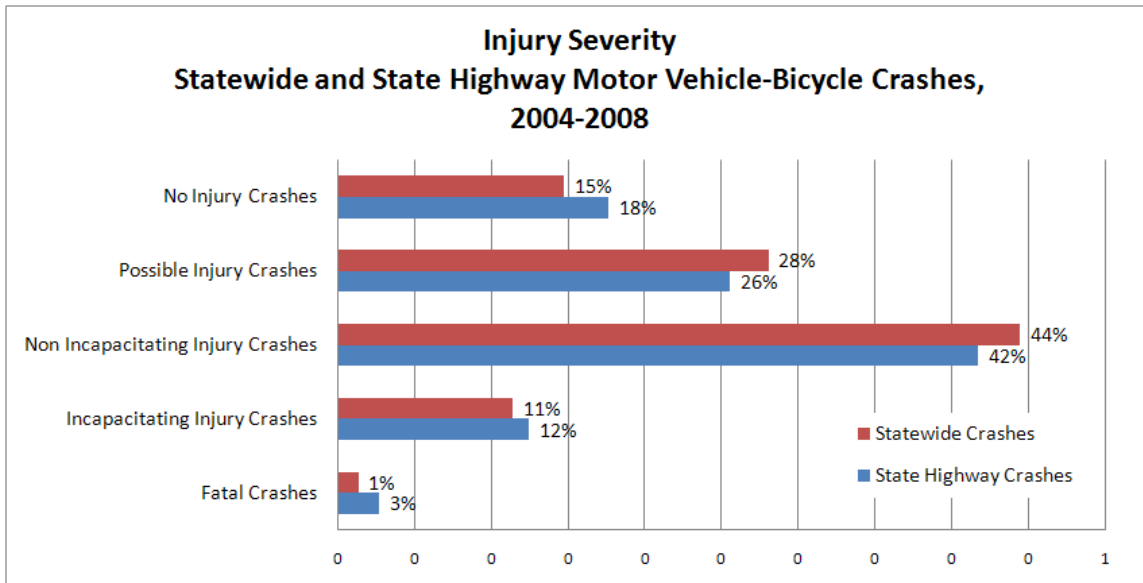


Figure 1 – Statewide and State Highway Motor Vehicle-Bicycle Crashes, 2004 - 2008, Crash Injury Severity

The identification of effective goals, objectives, and supporting activities is critical for a successful BSAP. The BSAP will identify appropriate improvements, programs, and strategies that have a track record of effectiveness. Although no single countermeasure or strategy will unilaterally reduce bicycle crashes, injuries, and/or fatalities, multiple appropriate countermeasures working together, can lead to a reduction in bicycle crashes. A decrease in bicycle incidents requires a comprehensive approach. Potential improvements, programs, and strategies will consist of a combination of:

- (1) Engineering solutions,
- (2) Education of bicyclists and motorists, and
- (3) Improving enforcement of laws and regulation.
- (4) Evaluation of the plan and data collection, in order to determine the plan’s effectiveness.

1.2 Study Area

The study area for the ADOT BSAP consists of all ADOT maintained highway rights-of-way. However, the study team fully recognizes that bicycle crashes, fatalities, and injuries in Arizona are not limited to state highway rights-of-way, but occur on all Arizona roadways including those operated and maintained by county, tribal, and local jurisdictions. Education programs and materials recommended in the ADOT BSAP will extend beyond the State Highway System to users of all of Arizona’s roadways including those in local cities, counties, and tribal lands.

1.3 Overview of Working Paper 2

This paper describes the bicycle safety goal and objectives to attain this goal along ADOT maintained highways. The goal and objectives are based on findings from *Working Paper No. 1*, and from research on federal and state safety plans, as they relate to bicycle safety. *Working Paper No. 2* includes the following:

- 1 – Introduction
 - Review of bicycle safety goals found in state and federal plans
- 2 – Bicycle Safety Action Plan Goal and Objectives
 - Proposed bicycle safety goals and identification of objectives

1.4 Goals and Emphasis Areas Defined

Goals, for the purposes of this paper, represent the desired outcome of activities or programs that may be implemented to improve bicycle safety in Arizona. A goal is a long-term end toward which programs or activities are ultimately directed. Goals define the desired state of bicycle safety at the end of a specified time frame and represent what can realistically be achieved. Effective goals are ‘SMART’ – Specific, Measurable, Achievable, Realistic, and Time Sensitive.

Emphasis areas represent the bicyclist safety areas that most need to be addressed. Selection of emphasis areas is data driven based on the analysis of bicycle-motor vehicle crash data. Identification of emphasis areas also considered public input as submitted via the on-line survey as summarized in *Working Paper No. 1*.

Practical and achievable strategies and countermeasures will be identified for each emphasis area in future project phases.

1.5 Existing Bicycle Safety Goals and Policies of Federal and State Plans

United States Department of Transportation (DOT)

On March 11, 2010 the United States DOT signed the Policy Statement on “Bicycle and Pedestrian Accommodation Regulations and Recommendations.” The purpose of this Policy Statement is to support interconnected bicycling and walking networks to increase bicycle and pedestrian safety. To accomplish this goal, every transportation agency is responsible for integrating bicycle and pedestrian facilities into transportation systems. The Policy Statement recommends the following actions:

- Consider walking and bicycling as equals with other transportation modes
- Ensure that people of all abilities and ages are considered when planning and designing facilities
- Go beyond minimum standards
- Integrate bicycle and pedestrian accommodation on new, rehabilitated, and limited-access bridges

- Collect data on bicycling and walking trips
- Set mode share targets for bicycling and walking and track them over time
- Remove snow from sidewalks, bike lanes, and shared-use paths
- Improve non-motorized facilities during maintenance projects

Federal Highway Administration (FHWA)

The safety mission for the Federal Highway Administration (FHWA) is to improve bicycle and pedestrian safety by integrating the “4Es” of safety: engineering, enforcement, education, and emergency services. The FHWA plans to incorporate these “4Es” into bicycle and pedestrian plans by using a systematic, data-driven approach.

FHWA documented the following goals in 1994 National Bicycling and Walking Study (page 2):

"to double the percentage of total trips made by bicycling and walking in the United States from 7.9 to 15.8 percent of all travel trips; and to simultaneously reduce by 10 percent the number of bicyclists and pedestrians killed or injured in traffic crashes."

The report is available at: <http://tinyurl.com/26ggzw5>, and at:

http://www.hsrrc.unc.edu/research_library/PDFs/The%20National%20Bicycling%20and%20Walking%20Study%20Title%20Page.pdf (accessed on December 20, 2010).

The 1999 update report entitled, National Bicycling and Walking Study (NBWS) Five Year Status Report by the U.S. Department of Transportation intended for the goals to be renewed every five years:

"The Secretary of Transportation is urged to renew the Administration's commitment to achieving the goals of the NBWS."

This report is available at <http://www.fhwa.dot.gov/environment/bikeped/study.htm> (accessed on December 20, 2010).

Most recently, the 2010 National Bicycling and Walking Study 15-Year Status Report stated:

"Though the reductions in pedestrian and bicyclist fatalities have met the goals set forth in the original study, there is always room for improvement in the area of safety (but) Creating environments that are safe for bicyclists and pedestrians of all abilities should continue to be a top priority. Though challenging in the short term, it is also important to improve the process for reporting and documenting pedestrian and bicyclist crashes and injuries."

This report is available at: http://katana.hsrrc.unc.edu/cms/downloads/15-year_report.pdf (accessed on December 20, 2010).

Arizona Department of Transportation (ADOT)

In 2007 the Arizona Governor's Traffic Safety Advisory Council developed the Arizona Strategic Highway Safety Plan (SHSP). The Plan identifies a vision and associated goals for reducing crashes in Arizona. The vision of the Arizona SHSP Plan is "zero fatalities on Arizona roads, your life depends on it" (the Every One Counts vision).

The Every One Counts vision is supported by a state "stretch" goal designed to bring about clear progress towards the Every One Counts vision. The goal requires a reduction in the number of fatalities on Arizona's roadways of approximately 12 percent by the year 2012. The base year of comparison was 2007.

The study reported that efforts to reduce the number of fatalities would likely have a positive effect on the number of serious injuries and non-serious injuries, and on the number of property damage only crashes. As time enables the state safety partners to effectively adopt SHSP guidance and direction into current planning and programming processes, and to collectively make progress towards reducing the annual number of fatalities, an additional SHSP goal addressing serious injuries may be added in the future.

The Plan selected a number of emphasis areas, and sub-goals and strategies were developed for each emphasis area.

1. Restraint Usage
2. Speeding
3. Young Drivers
4. Impaired Driving
5. Roadway / Roadside (lane departure and intersections)
6. Data Improvement

Although the Plan emphasis areas did not focus explicitly on bicycle emphasis areas, the report stated that all areas of safety will have to be addressed, to support a Zero fatality vision. As each emphasis area involves many aspects of crashes, it is likely that addressing the selected emphasis areas will provide benefits in other areas of traffic safety.

2 BICYCLE SAFETY GOAL, EMPHASIS AREAS, AND PERFORMANCE MEASURES

2.1 *Bicycle Safety Emphasis Areas*

In conjunction with the safety goals established by the USDOT, FHWA, and Arizona, a Bicycle Safety Action Plan goal was developed, which is:

Goal: Reduce the total number of bicycle crashes (fatalities and non-fatalities) on Arizona state highways by 12 percent by the year 2018.

This goal is considered a SMART goal because:

Specific – the goal specifies a reduction in total number of bicycle crashes.

Measurable – state highway crash data, which includes crash severity data, is readily available to measure achievement of this goal.

Achievable – The combination of improvements, programs, and strategies will achieve the goal.

Realistic – this goal is consistent with the SHSP, so is deemed realistic.

Time Sensitive – a 2018 time goal is given to achieve the goal.

Between 2004 and 2008 there were 1,086 bicycle crashes on state highways, equating to an average of 217 bicycle crashes on Arizona state highways each year. The reduction in bicycle crashes will be measured by a five year average (2014 to 2018), with the years 2004 through 2008 acting as the base years. This results in reducing the number of bicycle crashes by 26 crashes each year. With a baseline of 217 crashes per year and a goal of 12-percent reduction, the target is a five-year average of 191, a decrease of 26 crashes per year.

2.2 *Bicycle Safety Emphasis Areas*

Emphasis areas to improve bicycle safety on Arizona state highways are identified as shown in **Table 1**. Selection of emphasis areas is data driven based on the analysis of bicycle-motor vehicle crash data. Identification of emphasis areas also considered public input as submitted via the on-line survey as summarized in Working Paper No. 1. These emphasis areas support the goal of reducing bicycle crashes by 12 percent by the year 2018.

The majority of bicycle crashes in Arizona (approximately 90 percent) occur on local city and county roadways that are outside of the jurisdiction of ADOT. Although the goal and emphasis areas established in this working paper are focused on state highways, it is anticipated that the ultimate study recommendations and mitigation strategies that will be identified to achieve the goal will benefit both bicycle safety on state highways and local roadways.

Table 1 – Emphasis Areas to Improve Bicyclist Safety and Accommodation on Arizona State Highways

Emphasis Areas	Justification
Reduce the number of bicycle crashes in urbanized and developed areas (large urbanized, small urbanized, and small urban).	The vast majority of crashes occurred in urbanized areas. Crashes in rural areas represent a small percentage of crashes.
Reduce crashes in which a bicyclist or motor vehicles failed to yield at signalized intersections.	20 percent of all crashes are attributable to bicyclists or motorists failing to yield at signalized intersections.
Reduce crashes in which a bicyclist or motor vehicles failed to yield at unsignalized intersections.	14 percent of all crashes are attributable to bicyclists or motorists failing to yield at unsignalized (signalized) intersections.
Reduce bicycle crashes involving vehicles making a right turn.	51 percent of bicycle crashes occurred while the motor vehicle was making a right turn. The vast majority of these crashes occurred in commercial areas.
Reduce crashes in which the bicyclist was riding facing traffic.	52 percent of crashes occurred when bicyclists were facing traffic. Of these, 37 percent of crashes occurred while the motor vehicle was making a right turn.
Reduce crashes where the bicyclist was riding on the sidewalk.	32 percent of crashes involved a bicyclist riding on the sidewalk. Of these, 21 percent of the crashes involved the driver making a right turn.
Reduce bicycle crashes that occurred in dawn, dusk, or dark conditions.	22 percent of bicycle crashes occurred in dawn, dusk, or dark conditions.

2.3 Bicycle Safety Performance Measures

“FHWA and ADOT Stewardship and Oversight Agreement for Arizona” (March 2010) includes performance measures associated with the performance of the Federal Aid Highway Program in Arizona. These performance measures are developed, reassessed, and/or revised as necessary on an annual basis. The Agreement currently includes performance measures for pedestrian safety, including the number of pedestrian fatalities (current year + 4 year history), and the number of state highway system pedestrian fatalities (current year + 4 year history).

It is proposed that bicycle safety performance measures be considered for inclusion in the Oversight Agreement:

- Number of statewide bicyclist fatalities (current year + 4 year history).
- Number of state highway system bicyclist fatalities (current year + 4 year history).

Inclusion of bicycle safety data in the Oversight Agreement will demonstrate bicycle safety trends both statewide and on the state highway system.