SPR RESEARCH PROGRAM
SECOND-STAGE PROBLEM STATEMENT
FY 2009

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I. PROBLEM NUMBER

IM-09-00

II. PROBLEM TITLE

Reducing Motor Vehicle / Bicycle Conflicts on Arterials with Bike Lanes

III. RESEARCH PROBLEM STATEMENT

Many statewide policies aim to increase the use of non-motorized transportation modes, including bicycling. This includes investing in bicycle infrastructure such as bike lanes, paths, and parking. As a result of these policies, most new and rebuilt major arterials, which include many state highways, include bike lanes. Bike lanes are intended, in part, to address a primary barrier to bicycling – safety. The lanes are thought to improve safety by separating bicycles from motorized vehicles. In addition, they may increase people's perception of safety, thereby increasing rates of cycling.

Despite the separation, conflicts between cyclists and motor vehicles can still be a problem. When cyclists are in separate lanes, motor vehicle drivers may not be aware of them. Along the roadway, motor vehicles turning in and out of driveways pose a threat to cyclists. The potential for conflicts at intersections is great, as vehicles (motorized and bicycles) are turning or going straight through, often without separate signal phases or stop signs. While bike crash data are limited (many crashes go unreported), what data do exist indicate that intersections are a safety problem for cyclists. Nationwide, almost 60% of all on-road bicycle crashes occur at intersections. The City of Portland found that the top six bicycle crash types in that city investigated by the police department (2002-2006) were all at intersections, totaling 40% of crashes. Over 15% of the crashes were right or left hooks, where a turning vehicle crashed into a through bicyclist.

All motor vehicle-bicycle conflicts are a problem, but conflicts with freight vehicles can be particularly dangerous. As both freight and bicycle traffic through the state of Oregon increase, the potential for bike-truck conflicts will likely increase. Moreover, some design solutions that improve increase bicycle safety may restrict freight mobility, while having little effect on other motor vehicles. There are also many locations throughout the state where highway users cannot be separated by directing cyclists to a lower-classified road. Freight routes often coincide with commercial downtown streets, which may be arterials with bike lanes.

The safety of facilities with bike lanes is influenced by a number of factors, including its design and laws guiding vehicle operation. Currently, very little guidance exists on designing for bicyclists at intersections, and the current AASHTO guide (the Guide for the Development of Bicycle Facilities) is not based on comprehensive research. Research on improving compatibility of roadways between cyclists and freight is also lacking. In addition to design standards, law and law enforcement can influence safety. For example, Oregon law states that right-turning vehicles are not to enter the bike lane when turning right. In contrast, California law states that vehicles are to enter the bike lane. It is likely that many Oregon motorists do not know what the law i**s.**.]

IV. RESEARCH OBJECTIVES

The proposed research would evaluate the problem of conflicts between motor vehicle and bicycles on facilities with bike lanes and identify potential counter measures. The research would consider the range of vehicle users—bicyclists, light duty vehicles, and medium- and heavy-duty freight vehicles. Specific research questions include:

- What is the extent of the problem? (e.g. what share of all reported crashes are on facilities with bike lanes? What share are at intersections vs. driveways vs. other locations? What classes of motor vehicles are involved? What share are on freight routes? Are any types of facilities or locations over-represented?)
- What types of conflicts occur on arterials with bike lanes? (e.g. right hook, left hook, running stop light, etc.)
- What factors influence the number and type of conflicts? Factors may include, but are not limited to, intersection configuration, signal type and phasing, signage, topography, land use, traffic volumes (both motorized and bicycle), vehicle types, weather and lighting.
- What approaches have been taken in the U.S. and abroad to address these conflicts? The approaches investigated would include design and engineering options, as well as education, enforcement, and regulations on vehicle operations. Design options that should be investigated include, but are not limited to, marking or dashing bike lane or bike travel path through intersections, colored pavement for bike lanes along roads and at intersections, location of advance stop lines or bike boxes for motor vehicles and bicycles, other pavement markings, signs, and signal design and phasing, including bicycle-specific signals.
- Are there specific approaches (distinct from general motor vehicle approaches) to addressing bike/truck conflicts that should be applied to specific high truck traffic locations? Additionally, what solutions provide for increased bicycle safety, while maintaining freight mobility?
- How effective are these approaches?
- What additional research is necessary?

Research methods would likely include:

- Comprehensive literature review
- Interviews and/or focus groups with experts and system users, including freight interests.
- Analyzing statewide crash data.

Video surveillance of a sample of roadways with bike lanes. The sample would include a variety of intersection configurations and locations. The intersections would need to have a high enough level of bicycle traffic to observe actual and potential conflicts (including near misses).

V. WORK TASKS, COST ESTIMATE AND DURATION

Phase I: The first phase could include the literature review, interviews, and analysis of crash data
Estimated timeline: 9-12 months
Estimated cost: $60,000

Phase II: The second phase would include the collection of original data using video surveillance.
Estimated timeline: 12 months
Estimated cost: $80,000

VI. IMPLEMENTATION

The execution and implementation of this research could reduce the rate of motor vehicle/bicycle crashes and increase the operational efficiency of facilities. Motor vehicle/bicycle crashes at intersections are often serious injury crashes. Safer design and operational features could be immediately implemented in new, reconstruction and resurfacing projects and designs of roadways and intersections. By providing a specific truck related component, this research will help identify appropriatesolutions that increase bicycle safety while providing due consideration to the economic benefits of freight mobility.

VII. POTENTIAL BENEFITS

As a result of various policies and regulations in Oregon, most new arterials in urban areas include bike lanes, and more existing roads are being retrofitted with bike lanes. However, there is little research or guidance on reducing conflicts between motor vehicles and bicyclists in bike lanes at intersections or between bicyclists and freight vehicles. At the same time, state policies to reduce reliance on a single mode of transportation and reduce greenhouse gas emissions point to the need to increase the use of bicycles for everyday travel. To do so, people must feel safe while cycling.

VIII. SUBMITTED BY

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