

FY 2009 RESEARCH PROBLEM STATEMENT

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TITLE

IM-09-02 Reducing Motor Vehicle / Bicycle Conflicts at Intersections with Bike Lanes

PROBLEM (Description of need)

Concern about safety is a major reason many people do not bicycle for everyday travel. Many cities in Oregon have focused their efforts and resources by providing on-street bike lanes to increase rates of cycling. 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. However, not as much attention has been paid to what happens when a bike lane reaches an intersection. The potential for conflict here is great, as vehicles (motorized and bicycles) are turning or going straight through, often without separate signal phases or stop signs. When cyclists are in separate lanes, motor vehicle drivers may not be aware of them. Sometimes, when bicycle lanes are present, all pavement markings and signage are dropped at the intersection, leaving no guidance for motorists or bicyclists.

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.

The safety of an intersection with a bike lane 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. Related to the problem of right hook crashes, 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 is.

As cities in Oregon continue to install bike lanes along most major arterials, the potential for more conflicts will likely increase. Cities will be looking for ways to reduce such conflicts.

PROPOSED RESEARCH, DEVELOPMENT OR TECHNOLOGY TRANSFER ACTIVITY

The proposed research would evaluate the problem of conflicts between motor vehicle and bicycles at intersections with bike lanes and identify potential counter measures. Specific research questions include:

- What is the extent of the problem? (e.g. what share of all reported crashes are at intersections with bike lanes? Are these locations over-represented?)
- What types of conflicts occur at intersections 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 lane or travel path through 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.

- How effective are these approaches?
- What additional research is necessary?

Research methods would likely include:

- Analyzing statewide crash data.
- Video surveillance of a sample of intersections 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).
- Comprehensive literature review
- Interviews and/or focus groups with experts and system users

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, very little attention has been paid to what happens when a bike lane reaches a signalized intersection. Therefore, the potential for conflicts between motor vehicles and cyclists is great. 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.

The execution and implementation of this research could reduce the rate of motor vehicle/bicycle crashes at intersections, and increase the operational efficiency of the intersections. 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. Improved intersection design features may be easy and inexpensive to implement and have significant safety benefits.

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