



# *The Ohio Department of Transportation Office of Research & Development Executive Summary Report*

## **Examination of Factors Associated in Motorcycle Crashes in Work Zones**

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### **Problem**

The number of fatal motorcycle crashes has increased from 2006 to 2010, while the number of fatal motor vehicle crashes has decreased during the same period. The riding season in Ohio coincides with the majority of repair work on roadways. Roadway work zones alter the roadway surface, resulting in reduced traction between the wheel and the road, and alter vehicles' paths of travel, which can take riders' focus away from important hazards. The purpose of this research is to evaluate work zone related motorcycle crashes and provide the Ohio Department of Transportation (ODOT) and the riding community with the most current knowledge on the contributing factors associated with work zone related motorcycle crashes.

### **Objectives**

There are four objectives in this study.

- Objective One – Conduct a national survey on the state of practice on special treatments used with motorcyclists and work zones.
- Objective Two – Collect available data regarding crash characteristics associated with crashes in work zones.
- Objective Three – Conduct interviews with the riding community on the topic of hazards in work zones and possible remedies.
- Objective Four – Synthesize the findings from surveys and data analysis.

## **Description**

The research was completed through the collection of three sets of data.

- Data Set One – Information on the national state of practice was obtained from reports, journal articles, and personal interviews.
- Data Set Two – Information on motorcycle crashes that occurred in work zones throughout Ohio from January 2006 through July 2012 was obtained from the Ohio Department of Transportation and the Ohio Department of Public Safety.
- Data Set Three – Data on the perspectives of the motorcycling community was collected through the use of a survey conducted face-to-face with the drivers of motorcycles.

## **Project Description**

The implementation strategies identified through the national state of practice are broken down into two categories: rider and roadway based solutions. The rider based solutions provide the motorcyclist with advanced knowledge of the hazards and pavement degradations appearing further down the road. The roadway based solutions alter the surface of the roadway being traveled, the specifications stating when and how the work is to occur, or the design of the work zone.

The crash information obtained from the Ohio Department of Public Safety returned 454 motorcycle crashes in work zones during the time period studied. The Ohio Department of Transportation furnished the corresponding

construction plans and daily construction diaries for the work zones in which each crash occurred, providing a total of 170 projects that are attributed to 219 of the 454 crashes.

The survey collected responses from 612 motorcyclists during 24 motorcycle and community events. The perspectives obtained through this survey relate to a motorcyclist's views on perceived hazards and potential solutions, while also obtaining a brief idea of the rider's experience on motorcycles.

The final component of the study is mixed logit analysis for three models: two models are based on the data from the survey, and one model is based on the information related to the crashes. The mixed logit modeling determines the sensitivities of various parameters in relation to the remaining parameters.

## **Conclusions & Recommendations**

Through an analysis of the crash documents, high numbers of crashes are identified during lane closures and in the activity area of the work zone. Additionally, high numbers of crashes and fatalities occurred during projects in which roadway resurfacing and paving were being performed on the day of the crash. To reduce the amount of crashes, it is recommended to use either the rider based solution – signs indicating “Motorcycles Use Extreme Caution” and an identification of the hazard “Grooved Pavement” or “Uneven Lanes” – or the roadway based solutions of modifying the wedge transition used in Ohio or the implementation of “mill and fill.”

The investigation of the survey identified some discontinuities between the survey results and the analysis of the crash data. A potential solution is an increase in the education to the motorcycling community about these findings.

The mixed logit analysis identified three models examining the crash documents and the surveys. A recommended solution is the use of signage to provide the motorcyclist the opportunity to alter his or her route, based on the upcoming roadway obstructions.