

New Jersey Department of Transportation  
Bureau of Research

## Technical Brief



### Work Zone Safety Analysis

*The project described in this report involved an analysis of crashes in work zones in the state of New Jersey. A descriptive analysis of work zone crashes is provided along with models developed to identify factors that contribute to the frequency and severity of work crashes. Data from field studies performed in work zones in New Jersey are also provided, demonstrating speed limit compliance and driver lane changing behavior in New Jersey work zones.*

### Background

Work zone safety continues to be a priority area for our nation as well as for the State of New Jersey. Of the 30,797 fatal crashes due to motor vehicle crashes that occurred in the US in 2009, 1.9% or 582 fatal crashes occurred in work zones (FARS). Between 1998 through 2009 there were on average 833 fatal crashes per year in the U.S. in work zones. More than 80 percent of these crashes occurred in construction or long-term work zone areas. New Jersey experiences approximately 10 fatal crashes per year in work zones. On average there are approximately 6700 work zone fatal and non-fatal crashes every year in New Jersey. Of these crashes, 4800 are in construction work zones and 3100 are within State jurisdiction. Approximately 25% of the 6700 work zone crashes involve injuries.

### Research Objectives and Approach

The overall objective of this research was to perform an analysis of crashes in work zones in the state of New Jersey so as to identify critical areas in the work zones susceptible to crashes and key factors that contribute to these crashes. In addition, based on the findings of the work zone crash analysis, the research sought to identify countermeasures for reducing work zone crashes. Fatal and severe injury crashes occurring in construction work zone in New Jersey were analyzed so as to determine controllable factors that account for variation in crashes among construction work zones



### Findings

To identify the factors contributing to work zone crash frequency in New Jersey, three crash frequency models were developed estimating: total number of crashes; frequency of injury crashes; and frequency of property damage only crashes. Crash severity models were also developed. Crash Frequency (CF) models for total number of crashes found:

- Duration of the work zone is the most significant parameter related to total number of crashes for the general model.
- Length of the work zone is also a significant factor for crash occurrence.
- The frequency of work zone crashes is higher for daytime traffic than for nighttime traffic; nighttime produces fewer crashes.
- As expected, crash frequency increases as the average annual daily traffic (AADT) increases.
- Speed reduction affects work zone crash occurrence positively. An increase in the variance of speed change results in more crashes.

Based on these findings, it is recommended that:

- Duration of work zone projects should be minimized to reduce work zone crash occurrence.
- Keeping project lengths shorter reduces the number of work zone crashes.
- AADT has a big role in crash frequency. To minimize this impact, traffic should be diverted to alternate routes when appropriate conditions exist. Weekends instead of weekdays as an operating time is also another alternative for reducing exposure.
- Operating work zones during nighttime keeps the number of injury and property-damage only crashes lower.
- Speed reduction should only be applied for necessary operating conditions. The variance between the posted speed limit and the work zone speed limit should be optimized to prevent increasing crash occurrence.
- Lane reduction increases the number of crashes in frequency models. Therefore, lane closing strategies should be revised to minimize the number of lane drops for necessary conditions.

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A final report is available online at: <http://www.state.nj.us/transportation/refdata/research/>.

If you would like a copy of the full report, send an e-mail to:  
[Research.Bureau@dot.state.nj.us](mailto:Research.Bureau@dot.state.nj.us).

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