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New Jersey Department of Transportation
Bureau of Research

**Technical Brief**

# Work Zone Intrusion Alarm Effectiveness

*The New Jersey Department of Transportation continually seeks ways to improve work zone safety and better protect maintenance workers from injury. A device known as an intrusion alarm mounted on a traffic cone warns workers of vehicles that breach the work zone by emitting a loud sound when impacted by a vehicle. The Department commissioned a study in 2010 to evaluate the effectiveness of the device in protecting workers and its acceptance by workers.*

## Background

Workers in highway work zones routinely face dangerous situations that cause serious injuries and fatalities. In 2008, 720 fatalities occurred in work zones nationwide, representing two percent of all roadway fatalities. New Jersey reported 7 work zone fatalities in 2008. In order to reduce the incidence of and potential for fatalities/injuries in work zones, jurisdictions are deploying safety devices and systems to safeguard employees. One device, an intrusion alarm, detects vehicles breaching the work zone and sounds an alarm to warn workers in the proximate area.

## Research Objectives and Approach

The New Jersey Department of Transportation (NJDOT) commissioned a study in 2010 to evaluate how effective the "SonoBlaster!® Work Zone Intrusion Alarm" would be in protecting maintenance workers from injury caused by vehicles that breach the work zone, and how well it would be accepted by workers. The device is mounted on work zone barriers such as traffic cones and drums, and when activated by direct impact of a vehicle, it emits an alarm that warns workers of danger and alerts the driver who may be drowsy or distracted. The current model has a special mounting bracket (not shown in the figure) that allows the alarmed cones to be stacked for storage. The device was deployed in a NJDOT pilot test in which alarmed cones were used with standard cones to close a lane of traffic for maintenance work. Although no traveling vehicles impacted any of the alarmed cones during the observation period, two impact simulations were performed. Field observation and interviews were conducted during the pilot test to capture information for the evaluation.

## Findings

The key areas of evaluation and pilot test findings were as follows:

- Operation – Sound volume and duration were satisfactory during normal traffic conditions for distances of at least 200 ft, including when ear protection was worn, but no conclusion could be made about sound level during jack hammer operations.

- Mounting – Mounting the bracket on the cone to allow cones to be stacked for storage with the device in place was time-consuming and tedious.

- Set-up procedures – Several procedures must be completed to ready the unit for use. The unit must be cocked and tested without the $CO_2$ power cartridge installed, and the cartridge must be installed to power the horn. At the roadside, the control knob must be moved from the locked position to the unlocked position to arm the unit. Cocking the unit and verifying that the unit was cocked were difficult. Of most concern were instances when the alarm fired when the control knob was in the locked position prior to deployment.

- Storage and Portability – Units stack well, but the potential for misfires creates problems for moving units to the work site with cartridges in place.

- Durability – Mounting bracket in particular is susceptible to breakage under normal use.

Following the pilot test, NJDOT determined that no additional lane closure operations could be scheduled, and ended the field testing. Contributing to the decision was NJDOT's view that problems with quality control and reliability, combined with the cost of the alarm, raise serious doubts about the desirability of and benefits to be gained from deploying the device on NJDOT maintenance jobs. Questions concerning the effectiveness of the device in protecting workers from injury caused by errant vehicles that breach the work zone and its acceptance by workers could not be directly answered by this abbreviated study.

## For More Information Contact:


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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.

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