



Podcast 3:

Automated Speed Enforcement in Work Zones

Hello and welcome to the American Traffic Safety Services Association's Work Zone Safety podcast series. This podcast is based on work supported by the Federal Highway Administration under the 2011 Work Zone Safety Grant. Its purpose is to help practitioners familiarize themselves with the types of automated speed enforcement, or ASE, currently used in work zones and to discuss considerations for those practitioners who are interested in learning more about these systems or are considering whether a new ASE program is viable in their state or local jurisdiction.

This podcast along with many other products developed under the FHWA Work Zone Safety Grant, at workzonesafety.org.

This podcast will run for about 16 minutes.

Let's start by looking at the problem of speeding in work zones. Statistics show that speeding continues to be a leading contributing factor in motor vehicle crashes and fatalities in the United States. According to the National Highway Traffic Safety Administration, in 2010 alone more than 10,000 people lost their lives in speed-related crashes, and about one-third of all crash fatalities in work zones are speed related.

Both transportation professionals and researchers generally agree that active enforcement is the most effective way to reduce speeding in work zones. However, speed enforcement in work zones is not always as simple as posting police in the work zone. Oftentimes work zones are not conducive to active enforcement by officers. For example, the work zone layout may limit both the number of safe locations where officers can position their vehicles and the number of pull-off areas where violators can be stopped.¹ Active enforcement may also mean that officers will need to leave the work zone to cite a vehicle, which decreases enforcement visibility, or step out of their vehicles in the work zone, which opens them up to the risk of being struck by a passing vehicle.

Alternatively, photo speed enforcement systems provide active enforcement while remaining stationary, and they can consistently cite more drivers, which can increase compliance with posted speed limits. Another benefit is that they don't require officers to risk injury or death by exposing themselves to vehicles moving at high speeds through the work zone. Studies of fixed camera systems in general have shown that their use could result in a reduction in injury crashes of as much as 20 to 25 percent.²

¹ National Safety Council, "Fact Sheet: Roadway Work Zone Safety," 2005; see also, Ullman, G.L., M.D. Fontaine, and S.D. Schrock, *Creating Enforcement-Friendly Work Zones*, Texas Transportation Institute (College Station, TX: 2005); as well as Fontaine, M.D., et al. 2002. "Feasibility of Real-Time Remote Speed Enforcement for Work Zones," *Transportation Research Record*, 1818, Transportation Research Board of the National Academies, Washington, DC, 2001.

² Thomas, Libby J., R. Srinivasan, L.E. Decina and L. Staplin, "Safety Effects of Automated Speed Enforcement Programs: Critical Review of International Literature," *Transportation Research Record*, 2078, Transportation Research Board of the National Academies, Washington, DC, 2008. Available at:



So how do automated speed enforcement systems, or ASEs, work? Basically, an ASE uses fixed or portable roadside technologies that combine detection and photographic capabilities. Typically, these systems identify when a vehicle is speeding and capture a photo of the vehicle's license plates. Depending on State or local legal requirements, a photo of the vehicle's driver may also be taken. These images may be embedded with the date, time, location, and recorded speed. They are then reviewed by the agency or entity authorized to issue speeding citations that are mailed either to the vehicle's registered owner or, alternatively, the identified driver of the vehicle. The types of citations issued vary among the States where ASEs are legal for use in work zones. Fines can range from \$40 up to \$375 for the first offense, may or may not allow community service as an alternative to a fine, and points may or may not be registered against a driver's license.

In general, while various types of ASE systems are currently in use in 111 communities across 14 States in the United States, only 3 states have active speed enforcement programs for work zones.³ States with ASE programs typically have passed laws specifically authorizing the use of these systems. On the other hand, eight States have enacted some form of prohibition on using ASE. In addition, although Missouri lacks an authorizing state law, the Missouri Highway and Transportation Commission recently adopted a policy on automated traffic enforcement that authorizes photo speed enforcement in work zones when workers are present.

The rest of this podcast will look at the experiences of two of the three states with active work zones ASE programs, Illinois and Maryland, and will conclude with some lessons learned and general considerations for practitioners who may be interested in using these systems.

Let's start with Illinois. In 2006, Illinois became the first state to authorize the use of automated traffic enforcement programs to enforce speed limits in highway work zones. Illinois enabling legislation provided a legal framework for photo enforcement of speed limits in highway work zones when roadway workers are present. It also requires special signs to be posted to advise motorists that the van is present and monitoring speeds.

Illinois uses several vans equipped with photo speed enforcement technology and deploys them to work zones across the state. Each van is staffed by Illinois State Police officers who have been trained to use the onboard ASE equipment. The way the Illinois system works is that two radar systems – one upstream and one directly across the lane from the van – monitor the speeds of approaching vehicles. The range of the upstream radar is approximately one-quarter to one-half mile, while the across-the-lane radar measures the speeds of vehicles at about 150 feet upstream from the van. The speed determined by the upstream radar is displayed on a "Your Speed" variable message sign on top of the ASE van, which provides motorists a reminder that they are speeding and gives them a chance to slow

http://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwas09028/resources/Safety%20Effects%20of%20ASE%20Review%20of%20Int'l%20Lit.pdf

³ Caltrans Division of Research and Innovation, "Highway Worker Safety: Automated Speed Enforcement," August 3, 2011.

Available at:

http://www.dot.ca.gov/research/researchreports/preliminary_investigations/docs/automated_speed_enforcement_preliminary_investigation_8-3-11.pdf



down before they reach the van equipped with across-the-lane radar. The across-the-lane radar is used to determine whether the vehicle is exceeding a pre-defined speed threshold – in the case of Illinois, a ticket may be issued to any driver traveling over the speed limit, although other States have different ticketing parameters. But in Illinois, if a vehicle is detected speeding in the work zone, the two onboard cameras are activated to take pictures of the driver and rear license plate of the vehicle.

Follow-on analyses conducted by researchers to assess the system's effectiveness determined that the average speed of free-flowing vehicles in work zones where the system was deployed decreased between 3 and 8 miles per hour, and the percentage of vehicles speeding decreased by up to 54 percent in one location.^{4,5} In addition, using ASEs reduced the speeds of vehicles by 2 to 5 miles per hour for a distance of 1 and ½ miles downstream of the van location. Furthermore, the use of the system had a limited halo effect—in other words, after the departure of the van, drivers were still influenced to slow down—resulting in observed reductions in vehicle speeds by up to 2 mph for a distance of 1.5 miles downstream of the work zone for a period of 1 hour after the ASE vans were removed.

The Illinois experience shows that aggressive law enforcement, including the use of ASE vans, has contributed to a nearly 20% reduction in work zone fatalities during the 2006 to 2011 period.

As a point of comparison, a study on the effectiveness of using uniformed police officers in work zones in Illinois indicated reductions in vehicle speed ranging from 4 to 5 miles per hour with active enforcement by police in the work zone area.⁶

Now let's talk a little about the Maryland SafeZones program. The Maryland State Highway Administration, Maryland Transportation Authority, and Maryland State Police began a pilot automated speed enforcement program, which they called "Maryland SafeZones," in October 2009. This was the date a Maryland law allowing speed cameras in work zones became effective. The SafeZones pilot program ran from October 2009 through spring 2010, with the long-term SafeZones program beginning on July 1, 2010.

In the Maryland pilot program, which has since become a permanent part of the State's work zone speed enforcement activities, speed cameras are deployed aboard sport-utility vehicles called "mobile ASE units." These units can be located within the limits of any work zone on expressways and controlled access highways where the speed limit is 45 mph or greater.

⁴ Benekohal, R.F., M.V. Chitturi, A. Hajbabaie, M. Wang, and J.C. Medina, "Automated Speed Enforcement Effects on Speed in Work Zones," *Transportation Research Record*, 2055, Transportation Research Board of the National Academies, Washington, DC, 2008, pp. 11-20. Available at:

http://safety.fhwa.dot.gov/speedmgmt/ref_mats/fhwas09028/resources/Effects%20of%20ASE%20in%20Work%20Zones.pdf

⁵ Benekohal, R.F., A. Hajbabaie, J.C. Medina, M. Wang, and M.V. Chitturi, *Speed Photo-Radar Enforcement Evaluation in Illinois Work Zones*, FHWA-ICT-10-064, Illinois Center for Transportation, University of Illinois, January 2010. Available at:

<http://ict.illinois.edu/publications/report%20files/fhwa-ict-10-064.pdf>

⁶ Benkhal, Rahim F., *Speed Reduction Methods and Studies in Work Zones: A Summary of Findings*. Project IHR-014, Illinois Cooperative Highway Research Program, conducted by the Dept. of Civil Engineering, University of Illinois at Urbana-Champaign, for the Illinois Department of Transportation, in cooperation with the U.S. Federal Highway Administration. September 1992.



The Maryland ASE system uses lidar, a type of narrow-beam laser, to measure speeds. This beam is pointed at individual vehicles, ensuring that the speed measurement is of the vehicle selected rather than one that is nearby. This is particularly important in high-volume work zones. The system Maryland uses allows multiple violating vehicles in multiple lanes to be identified quickly. As in Illinois, signs advising drivers of the presence of the system in the work zone are required, and Maryland uses trailer-mounted “Your Speed” changeable message signs to let drivers know that they are speeding. Trained operators monitor the ASE system onsite, but Maryland State Police or Maryland Transportation Authority Police review all violations before citations are issued. Unlike Illinois, however, speed citations may be issued whether workers are present in the work zone or not.

As of July 15, 2011, Maryland had deployed seven mobile ASE units that rotate through a series of pre-determined work zones throughout the State. Safezone program stakeholders use a variety of factors to determine camera deployment locations, including roadway and work zone characteristics (such as facility type), speed limit, temporary traffic control activities, and whether traditional in-person enforcement is viable. Drivers can find out which work zones are using ASE by going online to the Maryland SafeZones web site.

The statistics show that the ASE program in Maryland has been strikingly successful, with the number of injury crashes in work zones dropping by more than 15% and the number of deaths dropping by an incredible 65% in the three years the program has been in place. These numbers are indicative of the fact that, overall, work zone crashes statewide decreased by 12%.

This reflects the fact that the program has been highly successful in deterring speeding in work zones. Since it began, the SafeZones program has contributed to a reduction of more than 80 percent in speed camera violations: when the program began, the ASE system detected about 7 out of every 100 drivers exceeding the speed limit by 12 mph or more; today, fewer than 2 drivers out of every 100 who travel through the state’s ASE-monitored work zones are determined to be speeding.

For any practitioner who is considering exploring the use of ASE, there are some important considerations and lessons from the experiences of Maryland, Illinois, and other states that can help smooth the way forward.

First, keep in mind that laws may need to be passed to authorize the use of ASE. In those states that don’t use ASE systems in work zones or other areas, legislation may be needed to authorize the state police or public safety commission to explore or initiate the use of photo enforcement in work zones. However, most enabling statutes go well beyond just permitting ASE in certain areas. They typically include a number of design details to lessen the risk of legal challenges and reduce political opposition, such as specifying the types of facilities where the ASE can be deployed—for example, interstates, expressways, state roads, etc.; they set a minimum speed limit for using ASE, such as only when the speed limit is 45 miles per hour or greater; they establish requirements for advance signage or public notification periods; they identify the citation issuing authority – such as the State Police, a public safety commission, or a private entity under contract to a state or local authority; finally, statutes may also set



the amount of the fines to be assessed against violators and determine the disposition of revenues accrued.

Another issue to consider is that public perception may be a challenge, but casting ASEs in work zones as a safety enhancement initiative will appeal to the broader public. A 2012 study conducted in Minnesota found that there is a perception among journalists and policymakers that ASE is controversial and unpopular with the general public. There are several general criticisms of photo enforcement, such as:

- That photo enforcement is more about government revenue generation than safety improvement.
- That photo enforcement represents an invasion of privacy and constitutes “Big Brother” style law enforcement.
- That drivers dislike the delay between the violation and receiving the ticket.
- That drivers prefer to have in-person contact with a ticketing police officers.
- That machines should not do police work.
- That photo enforcement equipment can make ticketing mistakes that are costly and time consuming for individuals to correct.⁷

Despite these objections, national public opinion surveys have generally shown a majority of Americans support ASE.⁸ Moreover, when ASE is limited to certain types of locations, such as work zones and schools, and a clear link to public safety is forged, ASE may not be as controversial with most of the public as the broader objections may make it seem. For example, an overwhelming 83% of Minnesotans surveyed in a 2012 study supported using ASE “in construction zones where workers are endangered.”⁹

These opinion surveys indicate that when the public is approached from a public safety perspective, they will be more more likely to accept the idea of photo enforcement, and being able to demonstrate that ASE has been effective in reducing speeds and improving safety will help to increase public acceptance over time.

A final consideration is that agencies and states must consider the processes associated with day-to-day management of the program. This includes a variety of measures, such as developing a process for implementing the system and determining where automated enforcement will be most effective; for example, ASE systems should be considered for locations where there is no congestion and speeds are typically high, and the vehicles containing the ASE should be located near the work area without interfering with work activities. Agencies should also determine how the program will be administered

⁷ Munnich, Lee., and Joseph D. Loveland, “Do Americans Oppose Controversial Evidence-Based Road Safety Policies?” *Transportation Research Record*, 2213, Transportation Research Board of the National Academies, Washington, D.C., 2011, pp. 9-12.

⁸ Shaheen, S.A., C. J. Rodier, and E. Cavanagh, *Automated Speed Enforcement in the U.S.: A Review of the Literature on Benefits and Barriers to Implementation*, UCD-ITS-RR-07-17 (Institute of Transportation Studies, University of California, Davis: 2007).

⁹ Douma, F., L. Munnich, J. Loveland, and T. Garry, *Identifying Issues Related to Deployment of Automated Speed Enforcement*, CTS 12-23 (University of Minnesota, Minneapolis, MN: 2012). Available at: <http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=2158>



and evaluated on an ongoing basis. Decisions will also need to be made, if they are not determined by enabling legislation, as to whether a violation will be treated as an administrative or civil infraction or as a moving violation that may result in points against a drivers' record. Furthermore, agencies will need to commit to engaging in an ongoing communication and coordination effort to engage key stakeholders, such as law enforcement, transportation agency staff, public legislators, and public safety staff in an effort to change the way motorists drive in work zones. Local courts should also be targeted for informational outreach from both the transportation agency and the law enforcement community. It will be important not only to educate judges about the law, but also to gain their support since they will be responsible for ensuring that the law is followed and violators are fined appropriately.

This concludes today's podcast. We hope you'll visit the Work Zone Safety Grant's podcast page for a list of references that practitioners can access to find out more about the studies that we've referenced and on ASE systems in general. Thank you for joining us, and please check back often to view the latest training and guidance products.