

## **Public Employers: Is This YOUR Work Zone?**

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### **Introduction**

Better protection is needed for our public-sector employees in work zones who are exposed to traffic hazards. Sobering statistics remind us that work zones are fraught with danger, with work zone crashes tending to be more severe than other types of crashes.<sup>1</sup> Over the past decade in U.S. construction and maintenance work zones alone, nearly 40,000 persons were injured and 1,100 were killed each year. To put this in perspective, that's roughly one work zone fatality every eight hours, and one work zone injury every nine minutes.<sup>2</sup> (This problem is not unique to the U.S. For example, in Canada, there are nearly 2,000 casualties and 40 fatalities annually due to vehicle crashes in work zones<sup>3</sup> and a total of 1,579 accidents occurred at road work zones on Germany's motorways in 2003 alone, with 973 injuries and 25 deaths).<sup>4</sup> There exists a real need for public employers to dig down and explore the impact of, and countermeasures available to reduce, vehicle-related hazards in all types of work zones on one often overlooked segment of the U.S. worker population: the public-sector worker.

Consider that statistics reveal roughly one-fifth of the 1,110 average annual construction and maintenance work zone fatalities discussed above were workers; and roughly 20 percent of these worker fatalities (19 in 2009 alone) were public-sector worker fatalities, with an estimated 14 of these being transportation-related.<sup>5</sup> When added to these 14 public-sector worker fatalities the total corresponding employees injured in these work zones and the corresponding worker fatalities and injuries in *other* types of public-sector work zones, and couple that with the increasingly hazardous conditions in our work zones, and under-regulation of safety issues for

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<sup>1</sup> Oregon Department of Transportation, (ODOT), 2010, *2010 Work Zone Safety Fact Sheet and Safety Tips*, (retrieved February 19, 2011)

([http://www.oregon.gov/ODOT/COMM/GoOrange/Work\\_zone\\_factsheet2010.pdf?ga=t](http://www.oregon.gov/ODOT/COMM/GoOrange/Work_zone_factsheet2010.pdf?ga=t))

<sup>2</sup> (ODOT 2010)

<sup>3</sup> Bushman, Robb, "Characteristics of Work Zone Crashes and Fatalities in Canada", Proceedings of the Canadian Multidisciplinary Road Safety Conference XV, June 5-8, 2005, Fredericton, NB (retrieved February 19, 2011) (<http://www.irdinc.com/library/pdf/WorkZoneCrashes.pdf>)

<sup>4</sup> Eurotestmobility.net, "Road Work Zone as a Risk Zone; Awareness Must Be Sharpened", (retrieved February 19, 2011) (<http://www.eurotestmobility.net/eurotest.php?itemno=78&lang=EN>)

<sup>5</sup> U.S. Bureau of Labor Statistics (BLS), 2010, (retrieved February 19, 2011)

([http://www.workzonesafety.org/files/documents/crash\\_data/2005-2009\\_worker\\_fatalities.pdf](http://www.workzonesafety.org/files/documents/crash_data/2005-2009_worker_fatalities.pdf))

public-sector workers as a group, and it becomes clear that public-sector employees continue to need better protection in work zones from vehicle-related accidents. This paper will:

- Bring into focus the magnitude of public-sector employee work zone fatalities and casualties from transportation-related accidents in public-sector work zones;
- Clarify the major contributing factors and why many experts expect the number of injuries and fatalities to rise;
- Explore how regulations and standards are evolving to enhance safety in these work zones;
- Explore what general actions this experienced Certified Flagger Instructor/Public-sector Safety Officer and experts in general advocate should be taken to better protect our public-sector workers in public-sector work zones;
- Examine some specific actions public-sector employers may take to prevent a tragic scenario where the question is put to them, “Is This YOUR Work Zone?” and the answer is “yes.”

## **The Magnitude of Public-sector Employee Work Zones Fatalities and Injuries**

When we think of public-sector work zone fatalities, typically only road construction and maintenance workers come to mind. More enlightened persons may have an expanded view, such as that presented in this more detailed definition of a work zone: “an area of a traffic-way where construction, maintenance, or utility work activities are identified by warning signs/signals/ indicators, including those on transport devices that mark the beginning and end of a construction, maintenance, or utility work activity. It extends from the first warning sign, signal, or flashing lights to the END ROAD WORK sign or the last traffic control device pertinent for that work activity. Work zones also include roadway sections where there is ongoing, moving, work activity such as lane line painting or roadside mowing only if the beginning of the ongoing, moving work activity is designated by warning signs and signals”.<sup>6</sup> However, the complete scope of work zone activity is even more encompassing than that provided by even this definition, as public-sector workers at risk in work zones include a much broader population, including survey crews, utility crews, law enforcement personnel, firefighters, EMS and rescue teams, vehicle maintenance personnel and tow truck drivers, military personnel, and more.

Clear and complete statistics covering all public-sector work zone casualties and fatalities remain elusive; but as we begin to piece together some of the bits and pieces of statistics that are readily available, the big picture becomes clearer. The most readily available statistics, those from the U.S. Bureau of Labor Statistics on vehicle related worker fatalities in just construction and maintenance work zones alone, illustrated below in Table 1,<sup>7</sup> show that of the 115 total fatalities in 2009 (the most recent year for which statistics are available at the time of the writing of this paper), 82 resulted from transportation-related incidents.

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<sup>6</sup> Indiana Department of Transportation (IDOT), 2007, *Indiana Highway Work Zone Crash Zone Statistics 2003-2007* (retrieved February 19, 2011)

([http://www.in.gov/indot/files/Indiana\\_Highway\\_Work\\_Zone\\_Crash\\_Statistics\\_2003-2007.pdf](http://www.in.gov/indot/files/Indiana_Highway_Work_Zone_Crash_Statistics_2003-2007.pdf))

<sup>7</sup> (BLS 2010)

**Fatal occupational injuries at road construction sites by selected characteristics, 2005-2009 — Continued**

| Characteristics  | 2005 | 2006 | 2007 | 2008 | 2009 |
|--|------|------|------|------|------|
| <b>Event or exposure<sup>4</sup></b>   |      |      |      |      |      |
| <b>Transportation incidents</b> .....  | 126  | 110  | 71   | 71   | 82   |
| Highway .....  | 28   | 22   | 20   | 22   | 25   |
| Collision between vehicles, mobile equipment .....                                   | 20   | 15   | 13   | 17   | 18   |
| Moving in same direction .....   | 8    | 3    | 9    | —    | 5    |
| Moving and standing vehicle, mobile equipment-in roadway .....                       | 8    | 8    | 3    | 10   | 10   |
| Vehicle struck stationary object or equipment on side of road .....                  | 5    | —    | 5    | —    | —    |
| Noncollision .....   | 3    | 5    | —    | 5    | 4    |
| Jack-knifed or overturned--no collision .....  | —    | 4    | —    | 4    | 3    |
| Nonhighway (farm, industrial premises) .....   | 17   | 13   | 5    | 5    | 7    |
| Noncollision accident .....  | 16   | 12   | 5    | 5    | 7    |
| Fell from and struck by vehicle, mobile equipment .....                              | —    | 5    | —    | 3    | 4    |
| Overturned .....   | 13   | 4    | 5    | —    | —    |
| Pedestrian struck by vehicle, mobile equipment .....                                 | 80   | 75   | 46   | 43   | 49   |
| Pedestrian struck by vehicle, mobile equipment in roadway .....                      | 60   | 48   | 26   | 28   | 33   |
| Pedestrian struck by vehicle, mobile equipment on side of road .....                 | 11   | 19   | 12   | 10   | 12   |
| Pedestrian struck by vehicle, mobile equipment in parking lot or non-road area ..... | 9    | 8    | 6    | 5    | 4    |

**Table 1: Fatal Occupational Injuries at Road Construction Sites by Selected Characteristics, 2005-2009, Event of Exposure: Transportation Incidents**

We can next estimate from this figure the number of *public-sector* workers impacted from Table 2 below.<sup>8</sup> Note the sharp increase in public-sector worker fatalities from 2008 to 2009.

**Fatal occupational injuries at road construction sites by selected characteristics, 2005-2009 — Continued**

| Characteristics                                      | 2005 | 2006 | 2007 | 2008 | 2009 |
|--|------|------|------|------|------|
| <b>Industry<sup>11</sup><br/>(NAICS) - continued</b> |      |      |      |      |      |
| <b>Government<sup>12</sup></b> .....                 | 18   | 24   | 15   | 11   | 19   |

**Table 2: Fatal Occupational Injuries at Road Construction Sites by Selected Characteristics, 2005-2009, Industry: Government**

We know that 82 (71%) of 115 total fatalities in maintenance and construction work zones involved transportation-related incidents, and 19 of the 115 total fatalities involved public-sector workers. The inference that 71% (14) of the 19 public-sector worker incidents were transportation related would not seem unreasonable in light of the lack of immediate availability of further breakdown of these statistics. Now let's add to these estimated annual 14 public-sector construction and maintenance work zone vehicle-related fatalities the slightly more elusive emergency responder vehicle-related work zone statistics involving public safety personnel that may be gleaned from Responder Safety News and other reliable sources:

<sup>8</sup> (BLS 2010)

- In 2010 alone, 16 law enforcement officers were tragically struck and killed outside their vehicles.<sup>9</sup>
- From 2003 through 2007 21 firefighters (an average of over 4 per year) were struck and killed by vehicles.<sup>10</sup>
- The emergency medical services profession adds to this tally at least two “struck at scene” fatalities in 2010<sup>11</sup>
- Reliable statistics for other miscellaneous types of public-sector employee work zones could not be located; yet they certainly exist--Internet search engines yield numerous tragic individual fatality reports or news stories for other types of public-sector workers (public-sector surveyors being just one example).

We now have a working total of an estimated *minimum* of 36 fatalities per year for just construction and maintenance, police, fire and EMT workers in work zones alone. While complete, accurate, total fatality statistics for all public-sector vehicle-related work zone fatalities remain somewhat elusive, injury statistics are perhaps even more elusive. However, we do know that each year, a total of more than 100 workers are killed and more than 20,000 are injured in the highway and street construction industry, according to the National Institute for Occupational Safety and Health (NIOSH).<sup>12</sup> Using this approximate 200:1 fatality to injury ratio, one may reasonably estimate that there are likely an estimated minimum 7,200 vehicle-related public-sector worker work zone injuries corresponding to the minimum 36 vehicle-related fatalities discussed above annually to public-sector workers in construction and maintenance, police, fire and EMT work zones alone. These numbers are alarming.

## Major Contributing Factors

According to federal and private studies, there are numerous major contributing factors that stack the odds against the safety of our public-sector workers from vehicle-related death and injury in all types of work zones:

- Driver inattention is the single largest factor in overall work zone crashes.<sup>13</sup>
- The leading cause of fatalities for workers in construction/maintenance work zones is being run over or backed over by vehicles; between 2005 and 2007 runovers/backovers were the

<sup>9</sup>Emergency Responder Safety Institute (ERSI), 2010, 16 Law Enforcement Struck by Deaths in 2010 in a Grim Reminder of Roadway Danger (Retrieved February 19, 2011)  
[http://www.respondersafety.com/Articles/18\\_Law\\_Enforcement\\_Struck\\_By\\_Deaths\\_in\\_2010\\_a\\_Grim\\_Reminder\\_of\\_Roadway\\_Danger.aspx](http://www.respondersafety.com/Articles/18_Law_Enforcement_Struck_By_Deaths_in_2010_a_Grim_Reminder_of_Roadway_Danger.aspx)

<sup>10</sup>Ashton, Richard J., International Association of Chiefs of Police (IACP), 2010, *New Federal Rule Seeks to Improve Officer Visibility at Roadside*, (retrieved February 19, 2011)  
 (http://docs.google.com/viewer?a=v&q=cache:mHQDiZ9ZyVwJ:www.respondersafety.com/Download.aspx%3FdownloadID%3D9c73e977-cb5b-40ee-a349279e598700f5+firefighter+struck+and+killed&hl=en&gl=us&pid=bl&srcid=ADGEESgc0EPBcbwj4PIAWIYkJL4KEZfaH5JYafzBqChclu8gwxjqpegTTwEkY3zsdrsX3LmeDDe26E0XeutPqA2LHBQPIUERmdXRj17nyQjqg5uQAgoHsgPNLmIyrXdJrthVNVQ2JgajP&sig=AHIEtbTHX3S6FsEazdth11INRZRzfPmhwA)

<sup>11</sup> National EMS Memorial Service, 2011, *2010 Notices of EMS Fatalities*, (retrieved February 19, 2011)  
 (http://nemsms.org/notices10.htm)

<sup>12</sup> “NIOSH Suggests Measures to Protect Work Zone Workers,” EHSToday.com News, 5/16/2001, (retrieved February 19, 2011) ([http://ehstoday.com/news/ehs\\_imp\\_34407/#](http://ehstoday.com/news/ehs_imp_34407/#))

<sup>13</sup> (ODOT 2010)

cause of an average of 50 percent of those worker fatalities<sup>14</sup>. While we often worry about construction workers being killed by motorists, road workers working behind the barriers in the work zone are at equal risk of being killed by construction vehicles due to their large “blind spots.” Each month, being backed over by a construction vehicle, often a dump truck, kills at least one worker.<sup>15, 16</sup>

- The second most common cause of worker fatalities are workers caught between or struck by construction equipment and objects.
  - In 2008 this was the cause of 16 percent of worker fatalities.
  - Between 2005 and 2007 this was the cause of an average of 14 percent of worker fatalities.<sup>17</sup>
- The third most common cause of worker fatalities in construction/maintenance work zones is collisions between vehicles/mobile equipment.
  - In 2008 this was the cause of 17 percent of worker fatalities.
  - Between 2005 and 2007 this was the cause of an average of 12 percent of worker fatalities each year.<sup>18</sup>
  - Often a large truck, which has more difficulty slowing down than smaller automobiles, approaching a work zone, precipitates the collision. Out of 1,074 work zone fatalities nationwide in a recent year, 235 (more than one in five) involved a large truck.<sup>19</sup>
- Excessive vehicle speed is also a serious problem<sup>20</sup>
- Strikingly, alcohol driver impairment (0.08% or greater Blood Alcohol Content) was determined to be a factor in a staggering 32% of all work zone crashes in 2010, with 38% of crashes involving one or more driver with a Blood Alcohol Content of 0.01% or greater.<sup>21</sup>
- Worker visibility is a primary concern.<sup>22</sup>
- Public-sector employers are often times unregulated or under-regulated with respect to worker safety (e.g. work zone safety issues) and inadequate focus may be placed on employee training, proper set up of the work zone, personal protective equipment, needed signage, and other protective equipment and practices.

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<sup>14</sup> National Institute for Occupational Health and Safety (NIOSH), 2010, *Injury Hazards in Road Construction*, (retrieved February 19, 2011) ([http://www.workzonesafety.org/files/documents/news\\_events/wz\\_conference\\_2010/injury\\_hazard\\_Fosbroke\\_Lincoln.pdf](http://www.workzonesafety.org/files/documents/news_events/wz_conference_2010/injury_hazard_Fosbroke_Lincoln.pdf))

<sup>15</sup> Centers for Disease Control and Prevention (CDC), 2011, *Highway Workzone Safety Equipment Visibility*, (retrieved February 19, 2011) (<http://www.cdc.gov/niosh/topics/highwayworkzones/BAD/default.html>)

<sup>16</sup> The National Workzone Safety Information Clearinghouse, 2011, *Preventing Backovers*, (retrieved February 11, 2011) ([http://www.workzonesafety.org/runover\\_backover](http://www.workzonesafety.org/runover_backover))

<sup>17</sup> (NIOSH 2011)

<sup>18</sup> (NIOSH 2011)

<sup>19</sup> Adler, Jim, “Texas Work Zone Car Crash Fatalities Show Need For Less Speed and Driver Distractions,” (retrieved February 19, 2011) (<http://www.jimadler.com/newsandviews/2010/03/texas-work-zone-car-crash-fatalities-show-need-for-less-speed-and-driver-distractions/>)

<sup>20</sup> (ODOT 2011)

<sup>21</sup> The National Work Zone Safety Information Clearinghouse, 2010, *Motor Vehicle Traffic Fatalities by Year, Construction/Maintenance Zone and the Highest Driver or Motorcycle Operator BAC in the Crash*, (retrieved 2010), ([http://www.workzonesafety.org/crash\\_data/workzone\\_fatalities/alcohol\\_fatalities](http://www.workzonesafety.org/crash_data/workzone_fatalities/alcohol_fatalities))

<sup>22</sup> Muncy, Connie, “When you can’t be heard, be seen! (SCH205)”, *Ohio Safety Congress (OSC), 2009*

- The concept of sovereign immunity for public employers, coupled with the fact that workers' compensation is often believed (erroneously) to be the only remedy available to injured workers, may also contribute to sub-optimal focus on protection of public workers in work zones.
- Only 25 states are State Plan states that require public employers to follow OSHA standards. Approximately 8 million public workers in this country go uncovered by the Occupational Safety and Health Act.<sup>23</sup>
- Budget concerns and diversity challenges can make it more difficult to ensure the safety and health of public workers.<sup>24</sup>

## Aggravating Factors and Why Many Experts Expect These Numbers to Rise

According to the Federal Highway Administration (FHWA), the annual number of people killed in motor vehicle crashes in these temporary work zones between 2002 and 2009 has seen a continual decrease (from a 2002 peak of 1,186 down to a 2009 figure of 667). But don't rest easy; despite these successes, the ongoing fatalities and casualties remain tragic, and we may well see this trend reverse itself as our roads continue to see increases in traffic volume, number of "increased-risk" road users, and more.

The negative effects of roadwork on road users and workers are increasing. We are seeing:

- More road congestion
- More work zones
- More lost lives
- Growing exposure
- Growing public frustration.

In further support, consider the following facts:

- We're traveling more miles without increasing highway capacity significantly. For example, according to the USDOT, from 1980-1998 vehicle travel was up 72%, while road miles were up a mere 1%.<sup>25</sup>
- 12 billion vehicle miles of travel a year are through active work zones and this number is expected to increase.<sup>26</sup>
- Active work zones are encountered one out of every 100 miles driven on the National Highway System.<sup>27</sup>
- Work zones on freeways are estimated to account for nearly 10 percent of overall delay, resulting in increasingly frustrated road users.<sup>28</sup>

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<sup>23</sup> National Safety Council (NSC), 2010, (Retrieved January 2, 2011), (<http://www.nsc.org/safety/health/Pages/211ProtectingthePublicWorker.aspx>)

<sup>24</sup> (NSC 2011)

<sup>25</sup> Federal Highway Administration (FHWA), 2010, *ITS and Work Zones*, (retrieved February 19, 2011), ([http://www.workzonesafety.org/files/documents/news\\_events/wz\\_conference\\_2004/its.pdf](http://www.workzonesafety.org/files/documents/news_events/wz_conference_2004/its.pdf))

<sup>26</sup> Federal Highway Administration (FHWA), 2008, (retrieved January 2, 2011), ([http://safety.fhwa.dot.gov/wz/nwzaw\\_events/factsheet08.htm](http://safety.fhwa.dot.gov/wz/nwzaw_events/factsheet08.htm))

<sup>27</sup> (FHWA 2010)

- Today, we are primarily rehabilitating and reconstructing existing infrastructure while maintaining a very high volume of traffic on the very facilities we are working on.<sup>29</sup>
- More than 20% of the National Highway System is under construction at peak construction season. That includes more than 3,000 work zones.<sup>30</sup>
- Working under traffic means more exposure of workers and road users<sup>31</sup>
- Night work is increasingly being used to manage work zone delay and reduce exposure of workers and motorists
  - 53% work zones designated as day work
  - 22 % as night work
  - 18% are active all day or nearly all day (18 or more hours).<sup>32</sup>

Another factor that must not be overlooked is the increase in seniors in our driving population. This group includes our rapidly increasing number of impaired elderly drivers. The issue of older drivers is an increasing problem as the U.S. population ages and life expectancy increases. Baby boomers began turning 65 in January, 2011. Within 15 years more than one in five drivers will be 65 or older according to the NTSB; couple that with the fact that older drivers tend to have decreased vision, cognitive function and physical abilities, according to the CDC.

Consider next ongoing concerns with DUI and an epidemic of motorists driving while tired, driving while distracted, and driving while multitasking as they program GPS units, text and talk on their cell phones, eat fast food, catch up on their reading, and engage in other extraneous activities.

## **Regulations and Voluntary Consensus Standards Have Evolved To Enhance Work Zone Safety**

The following sampling of evolving regulations and standards designed to enhance work zone safety is presented to illustrate the level of concern over work zone safety issues recognized by groups throughout the county in recent years.

Visibility is widely recognized as a major factor in work zone safety, and several major changes have taken place over recent years to improve worker visibility. First, one of the most critical members of the work zone crew is the flagger. The 2003 Manual on Uniform Traffic Control Devices (MUTCD) introduced a new requirement mandating the previously optional nighttime lighting of flagger stations.

Second, high-visibility apparel requirements have undergone a great deal of evolution in a relatively short period of time in an effort to further protect all workers in the work zone. ANSI/ISEA 107-1999, American National Standard for High-Visibility Safety Apparel, was introduced in 1999 in an effort to provide consistent, authoritative guidelines for the selection and use of high-visibility apparel in the U.S. This document was updated in 2004 and re-titled ANSI/ISEA 107-2004 American National Standard for High-Visibility Safety Apparel and Headwear in an effort to further improve worker safety through improved visibility (the standard

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<sup>28</sup> (FHWA 2010)

<sup>29</sup> (FHWA 2010)

<sup>30</sup> (FHWA 2010)

<sup>31</sup> Federal Highway Administration (FHWA), 2002, *A Snapshot of Peak Summer Work Zone Activity Reported on State Road Closure and Construction Websites*. Washington, D.C., August 2002

<sup>32</sup> (FHWA 2002)

primarily focused on class/performance designation, qualification of materials, the inclusion of headwear, and a new certification program). This document caused a bit of a stir as it was found to be unsatisfactory on a number of levels by the much-overlooked public safety/emergency response personnel; thus the subsequent issuance of ANSI/ISEA 207-2006, The American National Standard for High-Visibility Public Safety Vests. Most important of the provisions of this standard include the requirement for:

- breakaway construction to minimize the potential for “catch and drag” incidents;
- cut-out side for quick access to police officer’s weapons or EMS belt-mounted equipment;
- pockets/loops/badge holders/microphone tab/id panels;
- color-specific markings that clearly differentiate between different types of emergency personnel (red for fire department, blue for police, green for EMS, orange for DOT);
- garment dimensions that permit the garment to be worn over a firefighter’s coat.

Third, a variety of additional emergency services-specific national consensus standards were launched addressing emergency worker visibility and work zone protection (e.g. NFPA 1500-2007 Standard on Fire Department Occupational Safety and Health Program detailing the need for vests at roadway incidents and NFPA 1901-2009 Standard for Automotive Fire Apparatus requiring one traffic safety vest for each seating position).

Fourth, the 2009 MUTCD (Manual on Uniform Traffic Control Devices) improved on the 2003 MUTCD by mandating the use of high-visibility apparel by work zone workers not just within the right-of-way on Federal-aid highways, but on all streets and highways and in fact, even on private property that is “open to public travel.” “Open to public travel” includes toll roads and roads within shopping centers, parking lots, airports, sports arenas, and other similar business and recreation facilities that are privately owned but where the public is allowed to travel without access restrictions. Parking lots, parking garages, and similar areas are not included at this time, but there is speculation that a future MUTCD update may address these areas as well.

OSHA regulations pertaining to overall work zone safety remain limited and unchanging. The OSHA construction industry regulations of 29 CFR 1926, Subpart O (Motor Vehicles, Mechanized Equipment) address the operation of vehicles and equipment within an off-highway job site not open to public traffic. Subpart O presents only limited coverage of machinery or safety equipment, and does not cover work practices, traffic control plans or shift work. Flagging and signaling practices are discussed in general terms in Subpart G (Signs, Signals and Barricades) but this coverage too is limited. Also note this standard incorporates the 2000 edition of the MUTCD by reference; but makes no mention of the most current (2009) edition.<sup>33</sup> In 2009, recognizing the limited scope of OSHA regulations on work zone safety and concerned that transportation-related incidents remain the number one cause of on-the-job deaths, ASSE released its comprehensive ANSI/ASSE A10.47-2009 Work Zone Safety for Highway Construction which covers workers engaged in construction, utility work, maintenance, or repair activities on any area of a highway.

Noteworthy also is the fact that the Bill H.R. 2067, Protecting America’s Workers Act (PAWA), initially proposed by Senator Edward Kennedy, was relaunched in the 111<sup>th</sup> Congress (2009-2010). This bill was proposed to amend the Occupational Safety and Health Act of 1970 to

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<sup>33</sup> “NIOSH Suggests Measures to Protect Work Zone Workers,” EHSToday.com News, 5/16/2001, (retrieved February 19, 2011) ([http://ehstoday.com/news/ehs\\_imp\\_34407/#](http://ehstoday.com/news/ehs_imp_34407/#))



expand coverage under the Act that would have, among other things, placed all public employers under direct regulation by OSHA and as such perhaps helped to reduce the number of tragedies to public workers in work zones. This bill never became law. Sessions of Congress last two years, and at the end of each session all proposed bills and resolutions that haven't passed are cleared from the books. Members often reintroduce bills that did not come up for debate under a new number in the next session under a new number. Indeed, on January 5, 2011, H.R. 2067 was reintroduced in the 112<sup>th</sup> Congress (2011-2012) by Rep. Lynn Woolsey (D-CA6) as H.R.190, Protecting America's Workers Act (the progress of this bill may be tracked at <http://www.govtrack.us/congress/bill.xpd?bill=h112-190>).

## **Recommended Actions**

A sampling of actions that public employers might research and consider further are set forth below. There is little chance that the contributing and aggravating factors discussed above in this paper will improve in the foreseeable future (and in fact are anticipated by many to increase) and public employers will have little control over them, so it is wise to take any available actions to mitigate the hazards to the greatest extent possible.

### All Public Employers

Public employers that participate in work zone activities could benefit from the following actions:

1. Insure that you have available guidance documents including the federal Manual of Uniform Traffic Control Devices or your state's version of this document, applicable consensus standards, and a copy of applicable OSHA regulations.
2. Complete Job Hazard Assessments using guidance provided by OSHA. Clearly identify all hazards (including moving traffic at roadway incidents) and document specifically what PPE personnel should be wearing for the various types of emergencies your agency responds to.
3. Protect personnel in accordance with your agency's Roadway Incident Safety SOP or equivalent.
4. Insure your workers have received the requisite Incident Command System (ICS) training under the National Incident Management System (NIMS). This system will help insure the safety of workers participating in disaster response activities particularly when it involves an interagency effort.
5. Provide work zone employees with appropriate personal protective equipment as set forth in the federal Manual on Uniform Traffic Control Devices or your state's equivalent. Make certain that employees understand how to properly wear and care for this PPE and be able to identify when to replace it so it remains effective. The "High-Visibility Safety Apparel in Highway Work Zones" brochure produced by ATSSA that may be viewed at <http://www.atssa.com/galleries/rsti/Brochure%20on%20Decommissioning%20High%20Visibility%20Apparel%20-%20FINAL%20for%20Printing%200308.pdf> is a source of additional helpful information.
6. Insure that any traffic control zones being set up by your organization meet the requirements of the federal Manual on Uniform Traffic Control Devices or your state's equivalent.
7. Participate in National Work Zone Awareness Week, a national campaign sponsored by a variety of organizations including the United States Department of Transportation. The event is conducted at the start of construction season each year (first week in April) to raise

awareness of work zone safety issues and encourage safe driving through highway construction sites.

8. Participate, if applicable to your state, in the “Priority State Program” or similar programs. The Federal Highway Administration teamed up with the American Traffic Safety Services Association (ATSSA), a long-time national leader in promoting work zone safety, to offer no- or low-cost quality training to both public and private sector industries in 15 “Priority States” to improve work zone safety. (A “Priority State” is one of 15 states that are in the top half of states by fatalities and have a safety trend below the national average. For 2008, for example, these states included *Alabama, Arizona, California, Florida, Georgia, Indiana, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Pennsylvania, South Carolina, Tennessee and Texas*). Details on “Priority State” (and other) training and certification opportunities are available at [http://www.atssa.com/cs/work\\_zone\\_safety\\_faq](http://www.atssa.com/cs/work_zone_safety_faq).
9. Provide recurrent training and periodic recertification of employees by a nationally recognized certification body such as the American Traffic Safety Services Association. A variety of training courses and certifications are available to address the wide variety of activities and circumstances surrounding work zone activities of workers, such as traffic control zone set up, flagging, work zone supervision, night activities, utility activities, public safety work zone activities, short term and moving work zone activities, and more. As a Certified Flagger Trainer, this author considers proper training and, optimally, actual certification by a nationally recognized certification body to be crucial components to maintaining work safety in the work zone. To combat the increasing risk in our work zones to road workers, motorists, pedestrians and bicyclists, now more than ever it is critical that public entities conducting temporary work zone operations proactively insure the effective initial and recurrent training of their line staff and supervisory personnel engaged in work zone operations. Despite this obvious fact, the current disconnect between the increased prevalence of work zone hazards and the prevalence of ineffectively trained or untrained personnel remains astonishing as we continue to frequently see these and other work zone “common pitfalls” on America’s roads:
  - Workers wearing no (or a non-compliant) high-visibility garment, or wearing a compliant garment improperly;
  - Work zones located in blind areas and without sufficient advance notice to drivers (hilltops, road bends, etc.);
  - Work zone signage left in place when no work zone is in operation;
  - Absence of compliant, clear, positive guidance for the motorist;
  - Unlighted/inadequately lighted night operations;
  - Flaggers using non-standard flagging technique, no flag/paddle, or an improper flag or paddle;
  - Flaggers turning their back on traffic, crossing the centerline, and leaving themselves no escape route thus endangering themselves and their crew;
  - Flaggers distracted, chatting with others, or straying away from their post.
10. Consider also the following ideas:
  - Make an unannounced drive through some of your organization’s work zones today. Insure the work zones, devices, and flagger practices fully compliant with the Manual on Uniform Traffic Control Devices (MUTCD) or your State’s regulations. Insure there are no signs of problems such as multiple sets of skid marks, deviations such as damaged or missing devices or an inattentive flagger, or other warning signs.
  - One of the most significant concerns observed by this Certified Flagger Instructor is the need for better training of flaggers with respect to engraining in them what are known as

the “errant vehicle procedures”. Failure to properly, promptly and confidently execute these life-preserving procedures (which will have to be executed in mere seconds during an actual emergency) during the practical examination for the Flagger Certification Exam is the #1 failure mode noted by this Certified Flagger Instructor. (Indeed when a group of Certified Instructors was recently challenged by this instructor to quickly demonstrate these procedures, each and every challenged instructor conceded that this is indeed a challenging task). Randomly quiz your flaggers to see if they can quickly and correctly recite, in order, the following steps to take in the event of an approaching errant vehicle; if they cannot, retraining could mean the difference between life and death: 1) escape to safety (have you left a safe escape route?), 2) notify the work crew (do you have an effective means of notification that the workers will be able to hear and recognize over the work zone noise?) 3) return to their flagging duties (to prevent additional damage), and 4) write down and transmit any pertinent information (are they prepared to do so from their post?) After they properly recite this information, have them demonstrate it, over and over, until it becomes second nature so that in an emergency this life-saving action becomes instinctual.

- If a serious accident were to occur right this minute in one of your work zones and you had to take the witness stand in court to account for the quality, effectiveness, and recency of your employee training, how comfortable would you be?
- To minimize liability, have you considered going the extra step to obtain actual certification of your employees--certification by a nationally recognized organization with a nationally recognized and proven curriculum, using only carefully trained and monitored instructors meeting recurrency requirements? (*Note: actual certification vs. training is mandatory in several states at this time.*)
- Does your current training rely on nothing more than rote memorization, or do you include the critical behavioral-based safety component and hands-on testing component?
- Now is the time to properly train and certify (or retrain and recertify--currency counts) your work zone employees, traffic control technicians, and traffic control supervisors and insure that your training drives home these three valuable points:
- Respect breeds respect – Motorists will not follow the guidance you provide unless they feel your efforts “respect” their well-being and safety. Make sure the appearance of devices and traffic control set-up, and the appearance and behavior of flaggers in your work zones, convey that respect to the motorist.
- Uniform guidance elicits uniform response – Driver expectancy must not be violated. When drivers see uniform traffic control zone procedures and guidance in use with no deviations from the expected (i.e. MUTCD/State Regulations), from experience they know what to expect and can then move through the area safely and without confusion, hesitation, and unexpected (dangerous) behaviors.
- Flaggers must NEVER trust the driver – Flaggers must ALWAYS be prepared to take appropriate action in the event of an approaching errant vehicle
- Listen to your flaggers and work zone crew and address their concerns. Common complaints voiced among students this flagger instructor has trained over the years include:
  - Don’t have enough of, or the right type of, signs, cones, etc.;
  - Don’t have a realistically effective way of alerting the work crew of an incipient errant vehicle intrusion into the work zone;
  - Don’t have someone assigned to relieve them when they need a break;

- Flagging devices issued (paddle signs and flags) do not meet the requirements of the MUTCD for the devices;
- No one ever drives through the work zone once set up to insure effectiveness before traffic is permitted to drive through.

### Firefighters

Proactive strategies to protect Firefighters from being struck by vehicles according to Responder Safety News<sup>34</sup> include:

1. Training for all personnel on roadway incident safety;
2. Proper PPE – Turnouts/bunker gear (NFPA1971), helmet, hi-visibility vests;
3. Proper positioning of apparatus to create a safe zone;
4. Proper use and deployment of traffic control devices, e.g. signs, cones, flares, police cars, variable message signs;
5. Multi-agency & multi-jurisdictional cooperation, collaboration & communication; e.g. multi-agency training on roadway incident safety
6. Fire apparatus enhanced visibility design features.
7. Emergency warning lights designed for on-scene protection
8. High-visibility (reflective and fluorescent) chevrons on the rear of apparatus that comply with the guidelines recently passed for the newest edition of NFPA 1901.
9. Review the most current version of NFPA 1500-2007 and in particular Section 8.7 - Traffic Incidents - and document your agencies actions to comply with those guidelines.
10. Develop and document an SOP/SOG for roadway operations and use it as part of your training program and response operations. This is one of the elements of NFPA 1500-2007 standard. A free SOP template is available here: <http://tinyurl.com/6gfejn> or at this link: <http://www.respondersafety.com/Training/Downloads.aspx>
11. Personnel who are on-scene and are not directly exposed to fire, flame, excessive heat or hazardous materials must wear high-visibility garments (i.e. pump operators, fire-police, support personnel, command officers etc.) Any members assigned to respond to an emergency situation should be considered in the same environment as those engaged in active fire attack and should be staged OFF of the roadway and in a protected safe zone where they would not require hi-visibility gear until after the scene is under control at which time they can don a vest. Any personnel on scene could easily remove (tear-away) a high-visibility vest to react to unusual circumstances if necessary and don an air-pack to render assistance with direct firefighting actions.

### Department Of Transportation Workers

According to the Associated General Contractors of America, increasing police presence at highway and transit construction sites nationwide is the best way to cut the hundreds of work zone fatalities that take place every year.<sup>35</sup>

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<sup>34</sup>Federal Highway Administration FHWA, 2010, *Reducing Highway Fatalities*, (Retrieved January 2, 2011), ([http://www.respondersafety.com/Articles/New\\_Federal\\_Rule\\_23\\_CFR\\_Part\\_634\\_\\_Worker\\_Visibility\\_High-Visibility\\_Vests\\_.aspx](http://www.respondersafety.com/Articles/New_Federal_Rule_23_CFR_Part_634__Worker_Visibility_High-Visibility_Vests_.aspx))

## Novel Methods

### Smart Work Zone<sup>36</sup>

A '**smart**' **work zone** is a road construction zone in which technology is employed to increase safety and provide information. Smart work zones often use radar guns or other sensors to detect the presence and speed of vehicles approaching a work zone, in order to display an appropriate message on one or more variable message signs. In a "dynamic merge" system, for example, vehicles approaching a lane closure are directed to use all available lanes when congestion develops and speeds are low. When speeds are high, motorists are directed to merge early or are left to use their own judgment. Such a system is usually deployed in addition to traditional static messaging.

### Automated Flagger Assist Devices (AFAD)

Automated flagger assist devices may be used to flag traffic in place of a human flagger. Typically these devices incorporate a gate arm, a stop/slow sign, and a traffic signal with an audio alert siren. They may be used in place of a human flagger. Advantages may include higher visibility to the motorist from further distances than a traditional human flagger, eliminating the exposure of a person required to serve as flagger, and otherwise enhancing safety.

### Vehicle Mounted Crash Attenuators

A vehicle mounted crash attenuator, also known as an impact attenuator, crash cushion, or cowboy cushion, is a device intended to reduce the damage done to structures, vehicles, and motorists resulting from a collision of an errant vehicle with a work zone vehicle. Impact attenuators are designed to absorb the errant vehicle's kinetic energy and/or redirect the vehicle away from the hazard, and from roadway machinery or workers.<sup>37</sup>

### Work Zone Intrusion Alarms<sup>38</sup>

A work zone intrusion alarm is an impact-activated safety device that warns roadway workers and errant vehicle drivers simultaneously in roadway work zones. It mounts on typical work zone barricades, cones, drums, delineators, A-frames and other barriers. Upon impact of an errant vehicle, a built-in carbon dioxide powered horn blasts at around 125dB to signal workers that their protective zones has been violated, giving them critical reaction time to move out of harms way. The alarm can also alert distracted or drowsy drivers, allowing them to steer clear of the work zone or brake prior to reaching workers or equipment.

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<sup>35</sup> For ConstructionPros.com, 2010, *More Police Needed to Cut Work Zone Fatalities*, (retrieved February 19, 2011), (<http://www.forconstructionpros.com/online/Construction-News/More-Police-Needed-to-Cut-Work-Zone-Fatalities/4FCP15817>.)

<sup>36</sup> Wikipedia, 2011, "Smart Work Zone", (retrieved February 19, 2011) ([http://en.wikipedia.org/wiki/Smart\\_work\\_zone](http://en.wikipedia.org/wiki/Smart_work_zone))

<sup>37</sup> Wikipedia, 2011, *Impact Attenuator*, (retrieved February 19, 2011), ([http://en.wikipedia.org/wiki/Impact\\_attenuator](http://en.wikipedia.org/wiki/Impact_attenuator))

<sup>38</sup> The National Work Zone Safety Information Clearinghouse, *SonoBlaster Dual Work Zone Intrusion Alarm*, (retrieved February 19, 2011), ([http://www.workzonesafety.org/safety\\_products/record/8522](http://www.workzonesafety.org/safety_products/record/8522))

## Blind Area Diagrams<sup>39</sup>

"Blind-area" diagrams can be generated using physical measurements and computer simulations to reveal the space around construction vehicles where workers and vehicles are at the highest risk of not being seen. A well-developed blind-area diagram can better inform construction crews on how to best block roads and position workers. Diagrams are created using a method jointly developed by the Caterpillar Inc. and the National Institute for Occupational Safety and Health which plots equipment on a grid and determines visibility of other objects relative to the equipment. See <http://www.cdc.gov/niosh/topics/highwayworkzones/BAD/default.html> for more details on blind area diagrams. See <http://www.cdc.gov/niosh/topics/highwayworkzones/BAD/imagelookup.html> for actual blind area diagrams for a variety of construction vehicles.

## Summary

In reviewing and contemplating the information presented herein, hopefully the reader now has a clear understanding of the need for public employers to, and will in fact encourage public-sector employers to:

- comprehend and appreciate the magnitude of public-sector employee work zone fatalities and casualties;
- understand factors contributing to the injuries and fatalities to public-sector employees in work zones and why many experts expect the number of injuries and fatalities to rise;
- explore what actions should be taken to better protect our public-sector workers in work zones; and
- identify what specific actions public-sector employers should take to insure they will never have a tragic scenario occur where they have to give a "yes" answer to the question, "Is This YOUR Work Zone?"

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<sup>39</sup> (CDC 2011)