

**Stakeholder Meeting on
Preventing Backover Injuries and Fatalities
Washington, D.C.
January 8, 2013**

**Meeting Summary Report
March 12, 2013**

Table of Contents

	Page Number
1 INTRODUCTION.....	1
2 OPENING REMARKS	1
3 ADMINISTRATION OF THE MEETING	2
4 POINTS OF DISCUSSION	2
5 WRAP-UP AND NEXT STEPS.....	11

1 Introduction

This report summarizes key discussion points made during an informal stakeholder meeting that the Occupational Safety and Health Administration (OSHA) convened to provide a forum and to gather information on the best practices for preventing backover injuries and fatalities in the workplace. The meeting included a discussion of backover hazards, types of vehicles used, measures to reduce backover hazards, camera technologies, and training for drivers, spotters, and pedestrians. The three-hour meeting was held from 9:00 a.m. to 12:00 p.m. EST on January 8, 2013, at the U.S. Department of Labor (DOL) Frances Perkins Building in Washington, D.C. The purpose of the meeting was to elicit the views of employers, workers, and health and safety professionals about backover hazards in the workplace and how best to control them. OSHA held this stakeholder meeting as part of its effort to gather information about backover risks across various industries and potential solutions to reduce backover injuries and fatalities.

On March 29, 2012, OSHA published a Request for Information (RFI) on backover hazards in the *Federal Register* (77 FR 18973). The RFI was published jointly with a RFI on hazards of reinforced concrete in construction. OSHA received comments from 32 individuals and organizations, now available at www.regulations.gov under docket OSHA-2010-0059.

New technologies have been developed to address backover hazards, including cameras, proximity detection technology, and new types of audible alarms that direct the alarm's sound to the danger zone or combine the alarm's sound with lights to better focus the driver's attention on the hazard. In addition, internal traffic plans that control the flow of traffic and limit backing can help prevent backovers. OSHA is considering whether these new technologies, traffic plans, or other approaches, such as training for drivers and spotters, can better address the risks of backing equipment that have an obstructed view to the rear.

OSHA announced the stakeholder meeting in the *Federal Register* on December 17, 2012, with an explanation that parties interested in attending and participating should register in advance. This meeting had 23 participants, representing industry, unions, and trade organizations. Six Department of Labor employees from OSHA and the Office of the Solicitor also participated on the panel. All participants were given the opportunity to provide oral comments at the meeting. Members of the general public were allowed to observe the meeting (but only participate if time allowed) on a first-come, first-served basis as space permitted. Seventeen people attended the meeting as observers. Eastern Research Group, Inc. (ERG) provided logistical support for the stakeholder meeting, and a technical writer from ERG attended the meeting and prepared this summary report. This report captures the main discussion points that stakeholders raised during the meeting but is not a verbatim transcript of the meeting. Its content reflects stakeholders' remarks at the meeting, not the opinions of ERG or OSHA.

2 Opening Remarks

During the opening remarks for the stakeholder meeting, Ben Bare, Deputy Director, Directorate of Construction, welcomed the stakeholders and thanked them for their willingness to travel to the meeting to share their expertise on this important issue. Mr. Bare explained that this meeting would create a constructive dialogue that will help OSHA collect the best available information to continue working to prevent backover injuries and fatalities. Paul Bolon, Construction Standards and Guidance Office Director, Directorate of Construction, introduced the members of

the OSHA-SOL panel participating in the meeting, and explained that this was to be an informal meeting, as opposed to a hearing or a formal meeting. Mr. Bolon then gave an introduction to the topic of backover injuries and fatalities and described OSHA's efforts to date in gathering information about backover hazards.

As noted earlier, OSHA published an RFI last March on backover hazards and received 32 comments from employers, equipment manufacturers, trade associations, and unions. Since then, OSHA has met with experts from NIOSH and universities, conducted site visits, and continued to collect information about risks, technologies, and measures taken by employers to address backover hazards.

According to OSHA's Integrated Management Information System, there were over 350 backover fatalities over a six-year period; the Bureau of Labor Statistics recently began collecting specific information on backover fatalities, and found 79 such fatalities for 2011. Backover incidents occur in many industries that use large vehicles with an obstructed view to the rear, with larger numbers occurring in trucking, highway work zones, and sanitation.

OSHA's "Preventing Backovers" Web page presents further information on risks, technology, spotters, and resources (found at <http://www.osha.gov/doc/topics/backover/index.html>). Two states have already written regulations to address backover hazards, and the National Highway Traffic Safety Administration published a proposed rule requiring rear view cameras on all new light vehicles under 10,000 pounds.

OSHA has not determined whether rulemaking is appropriate to address backover hazards or what approach such a regulation might take, and is engaging affected stakeholders through stakeholder meetings. OSHA also is working to schedule site visits with affected employers to listen to their concerns and learn from their experiences. OSHA will place this summary and other information on the "Preventing Backovers" Web page.

3 Administration of the Meeting

Meeting facilitator Barbara Upston (of Management Consulting Associates) gave an overview of the meeting format. Ms. Upston also presented an overview of the agenda, including the specific questions that OSHA was asking the stakeholders to address. The stakeholder participants then described their affiliations and their experience with exposure to vehicle backover hazards. There was a 15-minute break, followed by a 90-minute discussion of the four questions presented by OSHA.

4 Points of Discussion

OSHA sought stakeholder input on four questions regarding backover injuries and fatalities: 1) What are the backup hazards in your industry? What types of vehicles? 2) What measures are effective in reducing or eliminating backover hazards? 3) Are cameras or other technologies used? 4) Do you train drivers, spotters, and pedestrians? How?

The following is a summary of the key stakeholder comments made during the meeting. Comments are grouped together by topic, without reference to the identity of the commenter.

4.1 *What are the backup hazards in your industry? What types of vehicles?*

- **Types of vehicles:**

- Though not a comprehensive list of vehicles that may pose backover hazards, the participants mentioned the following types of vehicles during the stakeholder meeting: nine- and 15-passenger vans, dump trucks, log trucks, chip trucks, road-paving equipment, concrete-delivery trucks, side-, front-, and rear-loading garbage trucks, grapplers and material handlers in recycling yards, excavators, forklifts, backhoes, single- and multiple-operator garbage trucks, skid-steer loaders, telehandlers, bulldozers, tractor trailers, and boom trucks.

- **Dynamic work environments:**

- One stakeholder mentioned that a lot of people are present on construction jobsites beyond the vehicle operators, which presents a challenge in minimizing backover hazards.
- In the residential construction industry, backover incidents are a big problem, especially with delivery trucks and concrete trucks. These construction sites change rapidly and people are often on site who are not workers, such as food truck workers, kids from the neighborhood, real estate agents, the general public, and others. Residential construction accounts for 1.6% of backover fatalities.
- Recycling yards are also dynamic work environments; therefore, the solution to eliminating backover hazards cannot rely on technology alone.
- Two sets of concerns are under discussion today: backing up in an organized environment and backing up on a dynamic job site, on which there is typically lower technology and equipment that breaks more often.

- **Backover hazards:**

- Backover fatalities occur in the construction and waste management industries every year.
- A stakeholder in the packaging manufacturing industry stated that the areas with the greatest backover hazards are in paper mills, in which 10,000 loads from log trucks are processed each year. The stakeholder described backover incidents as low-frequency but high-consequence. Also, most vehicles that come into facilities are not owned by the company but by small businesses, which creates a greater risk for backover hazards.
- Backovers are a big cause of injuries and fatalities in the road building industry.
- Another stakeholder noted that ready-mixed concrete trucks are required to back up many times every day, and backover hazards are the number one concern in terms of accidents. For every 100 ready-mixed trucks, there are 11 backover accidents per year.

- In recycling yards, backover hazards related to vehicle traffic are easier to control than in hazards related to materials handling. Additionally, hundreds of customers—who are not trained or familiar with the process—enter a small recycling yard on a given day.
- Another stakeholder described a waste services company with thousands of vehicles on the roads in over 25 states. Of this company’s incidents, 20 to 25 percent are related to backing. Despite the dangers, the company just completed its second year without a serious backover incident or fatality. One big concern in this industry involves front-loader garbage trucks, which back up approximately 500 times every day. Other areas of concern are landfill transfer stations and recycling yards, which use heavy equipment that exposes customers not familiar with the surroundings to backover hazards. The waste-services industry observed a 50 to 60 percent reduction in backover deaths over the past five or six years.
- **Backover injury and fatality data:**
 - If both private and public sector solid waste management fleets are counted, approximately 140,000 trucks are on the road each day. However, only two to five backover fatalities occur each year, which is much less than a decade ago. Also, trucks that do not need to back up often, such as side-loader trucks, still need to back up sometimes, such as in a narrow cul-de-sac.
- **Small independent fleets and rented equipment:**
 - In the road building industry, independent contractors often provide dump trucks and their drivers. Therefore, having adequate control over these drivers and vehicles is difficult. A relevant question is, “how do you control and train an independent contractor, whose job it is to deliver as many loads as quickly as possible?” However, even small companies are picking up at a common plant or pickup area. This may be a good location to inform drivers from small companies of any required practices or controls to minimize backover hazards.
 - Another stakeholder agreed that small employers in the waste management industry tend to have more backing accidents and fatalities than large companies with large fleets. In 2012, two fatalities occurred in small waste management companies, one of which was a small municipality and the other a small independent company. The stakeholder emphasized the importance of sharing data, and encouraged OSHA to focus on educating small employers.
 - Another stakeholder concurred that the small, independent companies often have poorly maintained, old vehicles and no developed training programs. Small, independent companies often go onto construction sites that are controlled by general contractors. The general contractor needs some sort of requirement to regulate independents that are coming onto a job site. The problem is blind spots, and the issue of how to provide drivers with adequate vision in these areas needs to be addressed.
 - On construction sites, the company of one commenter uses its own trucks first, but may need to use a sub-contractor for this purpose, who may hire another sub-contractor. The

second or third tiers are the real problems. Some of these sub-contractors use trucks that are not safe. Larger fleets are doing a good job, so far.

- In the recycling industry, people are not backed over with trucks: material handling equipment is the bigger hazard. Four or five incidents in recent years occurred with bigger companies having aggressive safety programs. In the stakeholder's industry, no link exists between size of company and risk of backover hazards.
- Another backover hazard not previously mentioned comes from renting equipment. A gap in understanding exists between the rental company and the operators. The rental company mentality is that renters take equipment off the lot and play with them.

4.2 *What measures are effective in reducing or eliminating backover hazards?*

- **Hierarchy of controls:**

- The ANSI Z10 hierarchical approach provides common sense ways to prevent backover injuries and fatalities. No one approach will eliminate backover hazards; however, a combination of controls can be much more effective. The hierarchical approach involves first attempting to engineer out the need to backup or minimizing backing up with internal traffic control plans. The approach also incorporates the use of technology when necessary, and supplements efforts with other work practices, such as signs, labels, training, highly visible vests, speed limits, and other practices.
- A paper processing company focuses on the ANSI Z10 hierarchy of controls. By designing loading stations to prevent the need to back up, these companies eliminate backover hazards. One stakeholder developed very specific procedures and controls for unloading chip trucks and log trucks that adhere to the hierarchy, such as establishing employee buffer zones in which only authorized workers are permitted in certain areas, incorporating engineering controls in which chip truck drivers control the off-loading process, and providing training, warnings, and signals. In the waste collection industry, one way to minimize backing hazards is to use automated side loading trucks instead of rear loading trucks. Many controls are available to minimize backover hazards; however, human error is always a factor. Therefore, training should always be a component of any safety program.

- **Traffic control plans:**

- Construction sites will often have traffic control plans that manage the ways that workers enter and exit the site.
- Builders often use traffic control plans to regulate traffic on a worksite. These plans are often communicated verbally by the site supervisor to delivery truck operators entering the site. A written plan would not be as useful, since it would most likely be placed on a shelf in the trailer. Many small companies do not have the resources to hire safety professionals to write traffic control plans or develop complex safety plans; therefore, the best that they can do is provide spotters.

- **Spotters:**

- Workers on residential construction sites typically use spotters when backing vehicles, since the worksite changes so often and the spotter and operator can adapt to changing scenarios better than technology. Builders have been doing this safely for a long time without the aid of expensive technology.
- **Effective ways to address backover hazards:**
 - Employers need to understand the risks specific to them. One stakeholder suggested looking at incidents that occur and looking at upstream indicators, such as near misses. For every incident that occurs, there are numerous minor incidents and injuries. These minor incidents should become the template employers use to develop their program. No industry wants to wait 10 years for OSHA to develop a well-crafted rule. There will be little push-back by industry if a rule is well crafted. Industry does not like performance-based standards that leave employers on their own, but also does not like overly prescriptive standards. The ideal regulatory approach is to determine the behaviors that need to be modified or emulated on worksites and then allow industries to come up with ways to change these behaviors.
 - The driver, victim, supervisor, and other “moving parts” have responsibility for backover injuries and fatalities. Another stakeholder favored performance-based standards and noted that regulations can get in the way of making conditions safe. The stakeholder emphasized that the more principled the rule, the better, and that regulation upon regulation will not fix the problem. The stakeholder suggested that employers should perform individual site safety analyses and that OSHA should develop a checklist that acts as a guide to recognizing problems and addressing them with various controls. Overall, the stakeholder emphasized that the better approach is to let industries come up with solutions to address hazards rather than to mandate specific controls.
 - The waste management industry has been successful in developing its own regulations to minimize backing hazards such that government regulation is not necessary, thereby allowing the industry to tailor regulations to its own unique risks. One stakeholder’s organization helped develop the ANSI Z245 standards, which are national consensus safety standards on trucks. OSHA enforces some of these standards through the General Duty Clause. The stakeholder noted that fatalities happen when employers do not follow the applicable ANSI standards.
 - Some states already have regulations that address backing hazards. According to a Virginia regulation, for example, a vehicle operator with an obstructed view has the option of getting out and walking around the entire truck before moving to prevent backover accidents. Maryland does not have the same law, but workers adopted the Virginia option as a best practice.
 - Employers already have an obligation to assess hazards and address them on sites, but backover deaths still occur. Small employers do not want performance-based standards: they want to know what exactly they need to do to be in compliance with the law. These employers want prescriptive language.

4.3 *Are cameras or other technologies used?*

- **Backup cameras:**

- Some construction companies have backup cameras installed on all their dump trucks but not on all equipment in the fleet. Installing cameras on certain pieces of equipment, such as forklifts or excavators, can be dangerous. Because excavators pivot and can move in multiple directions, cameras would need to be installed on all sides of the excavator, and the operator would need to switch cameras every time he or she pivoted.
- Cameras on ready-mixed trucks have had mixed results. The cameras have a high maintenance rate, especially with early camera technology. The ready-mixed industry tried cameras originally and they did not work well—drivers became too reliant on cameras and were not doing the physical things needed to assure safety. The stakeholder is wary of the idea to try cameras again, though newer technology is cheaper and appears, anecdotally, to be lasting longer and working better. Currently, less than 10 percent of vehicles have cameras.
- Companies need to depend primarily on the operator. Technology is useful on dump trucks, but road-building and bridge-building vehicles work in tight areas. Cameras will get dirty and broken on tight sites with piles of dirt. This situation adds the responsibility of cleaning the lens when it gets dirty. Each case needs to be judged on its own merits. OSHA should not have a standard in which every piece of equipment has a backup camera.
- Industries need multiple types of sensors because every industry is different. Cameras will not be effective on forklifts. Sometimes cameras will not work, but, in other situations, they will.
- For one company in the solid waste industry, backup cameras are mandatory on all garbage trucks. If the camera is out of service, the vehicle is considered out of service. The trucks use Doppler radar and other sonar devices, which go off if objects come close. Technology is advancing in a way that leads to fewer false-positive alarms. For smaller equipment, however, backup cameras or other technology can become a distraction to the operator, since an object has to be moving to be detected in some radar systems. The driver may be less likely to tune an alarm out if it is activated more selectively.

- **Cost of technology:**

- Not many companies have the money to invest in new technologies. Although equipment is expensive, backover incidents are also expensive.
- More and more equipment is coming with the option of camera technology features. Technology is making cameras smaller and cheaper. One stakeholder posed that pairing a camera with a radar system is the best option, given that the radar system will alert the operator to look at camera.
- In one case, the cost of cameras was \$250 per vehicle, which is a significant capital expense with a large fleet. Technology is good, but a combination of measures is needed to eliminate backover hazards.

- **Radio frequency identification (RFID) systems:**
 - RFID systems require a transmitter and a receiver. In some areas with one access point, employers can make sure that every item that is a possible backover hazard is tagged; however, when the public is involved, employers cannot tag them all. Tagging systems need a controlled environment to be effective.
 - Another issue with RFID systems is that the battery in the tags can lose their charge over time. Tagging technologies are often used in mining. Subcontractors are frequently on site, which would result in a challenge to tag all of them. Workers will continue working when tag charges wear out, because they do not want to lose a day of pay.
 - RFID tags work well in the scrap industry with processing equipment. Tagging systems are placed in special pockets of high-visibility clothing. One stakeholder noted that a danger exists that someone will rely on the technology too much, which diminishes the chances of the workers getting out of the equipment to look for hazards. Further, employers do not want the RFID tags to shut down the equipment, so the employers need to decide how employees are to react to an activated tag.
- **Drawbacks to technology:**
 - Cameras installed on some vehicles can become a distraction, causing the driver to pay less attention to the load.
 - Backup alarms are easy to ignore because workers get used to constantly hearing them. Some recycling yards have had success with workers carrying whistles, given that the unique sound is only heard when a worker is in danger. In one incident, the driver and the victim were the only two people who were unaware of an impending backover. All the other workers were yelling and the alarm was going off. This resulted in the company giving whistles to workers.
 - Many home builders would like to see simpler options than this technology. Many workers do not like technology and do not like to switch to new technology, even if it comes standard on equipment. Operators already perform work safely with spotters, without using any technology.
 - Another limit to technology is that it still requires the driver to react. Discussion involved developing tag systems that warn workers outside vehicles.
- **Advancements in technology:**
 - Companies are developing technologies to augment drivers' awareness of their surroundings and to develop ways to integrate these technologies into the types of vehicles involved in backup incidents. One electronics company is developing proximity detection radar systems. Technology companies are interested in hearing more about the issues on worksites, and designing the technology to address those issues.
 - New technologies are being developed in which integrated sensors change backup alarm noises by making the tones faster and louder as an object draws nearer.

- Some alarms will not sound until an object comes into detection range.
 - White noise alarms allow the alarm tones to be directed in only the relevant direction, so they will not be heard by workers in front of the truck if it is backing up. White noise alarms use multiple tones playing simultaneously, and the sound emanates in the danger area of the vehicle. Multiple tests show that a person wearing a blindfold can locate white noise alarms. Tonal alarms can be heard by people in a wide radius.
 - In the paper production industry, chip truck drivers transfer their load to the conveyor belt themselves. If the driver walks away from the designated area, the whole system shuts down due to area sensors; therefore, avoiding setting off the sensors is in the driver’s best interest given that they are paid by the load.
- **Using technology for behavior modification:**
 - Some companies install driver cameras on their fleet which capture footage when risky driving conditions occur. The camera is focused on both the driver and the driver’s view. It monitors hard braking, acceleration, and rough rides. The system then sends the employer the footage. These videos can be shown at safety meetings for training and behavior modification purposes. The stakeholder buys vehicles with the driver cameras in place. The cameras are costly but effective.
 - These cameras record continuously. They have a built-in SD card that always records, and the amount of footage captured is programmable to the customer’s preferences. This stakeholder also emphasized that speed is the key contributor to backing accidents. The approach speed of the object and the backing speed of the vehicle are the most important. Vehicle operators should back up at less than three miles per hour.

4.4 *Do you train drivers, spotters, and pedestrians? How?*

- **Training programs:**
 - One component of an employer’s driver training for nine- and 15-passenger vans is GOAL, which stands for “Get Out and Look.” The employer also performs driver audits, which reveal that drivers have a hard time backing up. The employer now requires that drivers practice backing maneuvers.
 - Another employer has a pilot program, which uses cones to demonstrate blind spots to drivers while they are performing backing operations. The employer also trains workers on foot to be aware of vehicles.
 - One way to view driver training is to divide it into three areas: the mindset of the driver, the driver’s skill set (some accountability is attributed to the driver), and a toolset (equipping the worker with the right equipment). Training should be kept as basic as possible. For instance, use BOWNOW, which stands for “Back Only When No Other Way.”

- Several stakeholders mentioned that reducing backover hazards ultimately comes down to supervision and training. However, ensuring that drivers from small or independent companies on a larger worksite receive proper training is a challenge.
- **Using technology in training:**
 - Employers can now use technology as a coaching tool for vehicle operators. In the waste management industry, many companies use a behavior-modification tool mounted on the windshield to help the driver understand how their decisions influence their risks, while also providing information to the employer. Data from the equipment are taken through a call center and then shared with the driver. This approach ties traditional styles of training with new technology.
- **Hand signals:**
 - The ready-mix industry already uses a standardized set of hand signals; however, the industry is not interested in establishing a hand signal regulation. Distributing those hand signals has been a challenge. If OSHA developed standardized hand signals, these signals should be provided as guidance or a non-mandatory appendix. Additionally, workers must already be trained in the hazards associated with their job. Therefore, if backover hazards are associated with a job, the existing standard should already cover them.
 - OSHA’s “Preventing Backovers” Web page lists a set of hand signals for informational purposes; these hand signals are based on input from many industry sources.
 - One stakeholder noted that a set of standardized hand signals would be helpful, whether OSHA mandates them or puts them in a non-mandatory appendix. OSHA could, however, mandate that the spotter and operator use a common set of hand signals for communicating with each other.
 - One stakeholder concurred that standardized hand signals should be required between drivers and spotters, noting that a site often contains many employers, each with its own workers and little control over other workers. Workers may help workers from other companies back up vehicles. When employers do not know everyone on the site, or when there are independent contractors on the site, standardization is needed.
 - One stakeholder proposed that standardized training is needed for each specific industry, especially with regard to backing. The stakeholder also noted that many of these industries have aging work forces and people with certain physical limitations.
 - One stakeholder suggested that a rule for detailed hand signals would not be effective. ANSI Z245.1 lays out some basic recommended hand signals to use; however, the underlying issue is the communication between the driver and workers. From a regulatory side, the stakeholder suggested developing some recommendations for hand signals for various industries; however, this commenter noted that mandating specific hand signals would not accomplish the goal of improving communication.

- Spotters typically are backed over when the driver loses sight of the spotter but keeps backing up. Spotters are backed over with some frequency, even if the alarm is working properly.
- **Driver skill issues:**
 - Training is near the bottom of the hierarchy of controls. Backover injuries result because equipment is designed with blind spots—it is not an issue with driver skills.
- **Amount of time spent training:**
 - One employer’s training program involves at least 10 days of initial training for certified drivers and four hours of annual defensive driver training. One of those four hours is devoted exclusively to backing up. Additionally, the program involves an active behavioral connections observation system that requires every employee to be trained in some way at least once a month, with tailgate talks, formal route observation, or in-cab observation, or other similar efforts. In addition, an evaluation process divides workers into three designations: A, B, or C. “A” employees are those with least risk, “B” employees are more risky, and “C” employees are at the greatest risk for backover incidents. This classification determines how much training workers need in the course of a month.
 - One stakeholder emphasized that industry is not proactive enough with backing training. One hour of training is not enough, and backing should be given more attention. Another stakeholder countered that this hour of training is reinforced with the drive camera and follow-up training.
- **Additional research:**
 - Various stakeholders noted that more information is needed about whether spotters, other workers on the same crew, small subcontractors, pedestrians, or safety professionals were the main victims of backover incidents. Another area to research is the relation of employer size to backover incidents. These data would help determine where to focus training.
 - The National Institute of Occupational Safety and Health (NIOSH) has conducted substantial research concerning backover hazards in the sanitation area in the past five or six years. OSHA should work with NIOSH and other applicable agencies to collect information on this topic.

5 Wrap-Up and Next Steps

Mr. Bolon, Construction Standards and Guidance Office Director, Directorate of Construction, thanked all the stakeholders for attending the meeting and providing their input. He also thanked those who had helped plan the meeting, and thanked Ms. Upston for serving as the facilitator.

Mr. Bolon noted that OSHA plans to have further contact with stakeholders regarding this important issue, including at the next stakeholder meeting on February 5, 2013, in Arlington, Texas. OSHA will post the notes from this meeting on its “Preventing Backovers” Web page at

<http://www.osha.gov/doc/topics/backover/index.html>. He concluded with a reminder that OSHA has a toll-free phone number, 1-800-321-OSHA (6742) that people can call to get additional information or guidance. In addition, OSHA provides free onsite visits and can help small businesses with occupational safety and health issues.