A back over incident occurs when a backing vehicle strikes a worker who is standing, walking, or kneeling behind the vehicle. These incidents can be prevented. According to the Bureau of Labor Statistics, over 70 workers died from back over incidents in 2011. These kinds of incidents can occur in different ways. For example:

In June of 2010 an employee was working inside a work zone wearing his reflective safety vest. A dump truck operating in the work zone backed up and struck the employee with the rear passenger side wheels. The employee was killed. The dump truck had an audible back up alarm and operating lights.

In June of 2011 an employee was standing on the ground in front of a loading dock facing into the building while a tractor trailer was backing into the same dock. The trailer crushed the employee between the trailer and the dock.

> The purpose of this insight is to provide information about the hazards of back overs; solutions that can reduce the risk or frequency of these incidents; articles and resources; and references to existing regulations and letters of interpretation.

How do back over incidents occur?

Back over accidents can happen for a variety of reasons. Drivers may not be able to see a worker in their blind spot. Workers may not hear backup alarms because of other worksite noises or because the alarms are not functioning. A spotter assisting one truck may not see another truck behind him. Workers riding on vehicles may fall off and get backed over. Drivers may assume that the area is clear and not look in the direction of travel. Sometimes, it is unclear why a worker was in the path of a backing vehicle. A combination of factors can also lead to back over incidents.

What can be done to prevent back over incidents?

Many solutions exist to prevent back over incidents. Drivers can use a spotter to help them back up their vehicles. Video cameras with in-vehicle display monitors can give drivers a view of what is behind them. Proximity detection devices, such as radar and sonar, can alert drivers to objects that are behind them. Tag-based systems can inform drivers when other employees are behind the vehicle and can alert employees when they walk near a vehicle equipped to communicate with the tag worn by the employee. On some work sites, employers can create internal traffic control plans, which tell the drivers where to drive and can reduce the need to back up. In some cases, internal traffic control plans can also be used to separate employees on foot from operating equipment.

Training is another tool to prevent back over incidents. Blind spots behind and around vehicles are not immediately obvious to employees on foot. By training employees on where those blind spots are and how to avoid being in them, employers can prevent some back over incidents. One component of this training can include putting employees who will be working around vehicles in the driver's seat to get a feel for where the blind spots are and what, exactly, the drivers can see.

Cameras

Most vehicles (and some types of mobile equipment) can accommodate a camera that provides operators with a view to the rear. Some vehicles come equipped with cameras or may be offered with

them as optional equipment. Camera systems can also be purchased as after-market equipment for vehicles. Viewing screens may be dash-mounted but must not block the driver's view out the windshield. Harsh environments, such as some construction sites or mines, may require more rugged cameras. Determining where to mount a camera for maximum effectiveness may be difficult, especially on large vehicles.

For example, dump trucks may require two or three cameras to monitor the blind spots on the front, rear, and side of the vehicle.

Proximity Detection Systems

Radar and ultrasonic technology both are used in backing safety systems. A radar system transmits a signal, which is bounced off an object. The signal is then received by a receiver. These systems alert the driver with a visual and/or audio warning. These systems must be positioned so that they won't detect harmless objects, such as the concrete slab of a driveway, which can interfere with the detection of an object or person behind the vehicle or mobile equipment. Also, the composition of an object can affect detection, with some materials being virtually invisible to radar. Like cameras, this equipment can be mounted on most vehicles and may be an option from some manufacturers. Ultrasonic systems, such as sonar, emit bursts of ultrasonic waves in a frequency above the hearing threshold of humans. When the waves strike an object, they generate echoes used to determine the distance to the object.

Backing Safety Solutions

Spotter

Spotters are a proven method of protecting employees on foot behind vehicles with an obstructed view, but spotters themselves can be at risk for injury or even death. Employers can implement the following actions to help keep spotters safe:

- Ensure that spotters and drivers agree on hand signals before backing up.

- Instruct spotters to always maintain visual contact with the driver while the vehicle is backing.

- Instruct drivers to stop backing immediately if they lose sight of the spotter.

- Not give spotters additional duties while they are acting as spotters.

- Instruct spotters not to use personal mobile phones, personal headphones, or other items which could pose a distraction during spotting activities.

- Provide spotters with high-visibility clothing, especially during night operations.
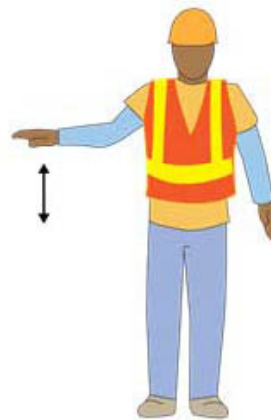
Suggested Spotter Signals

Back up

Back, turn left

Back, turn right

Distance left to back

Slow down

Stop

Move Forward