

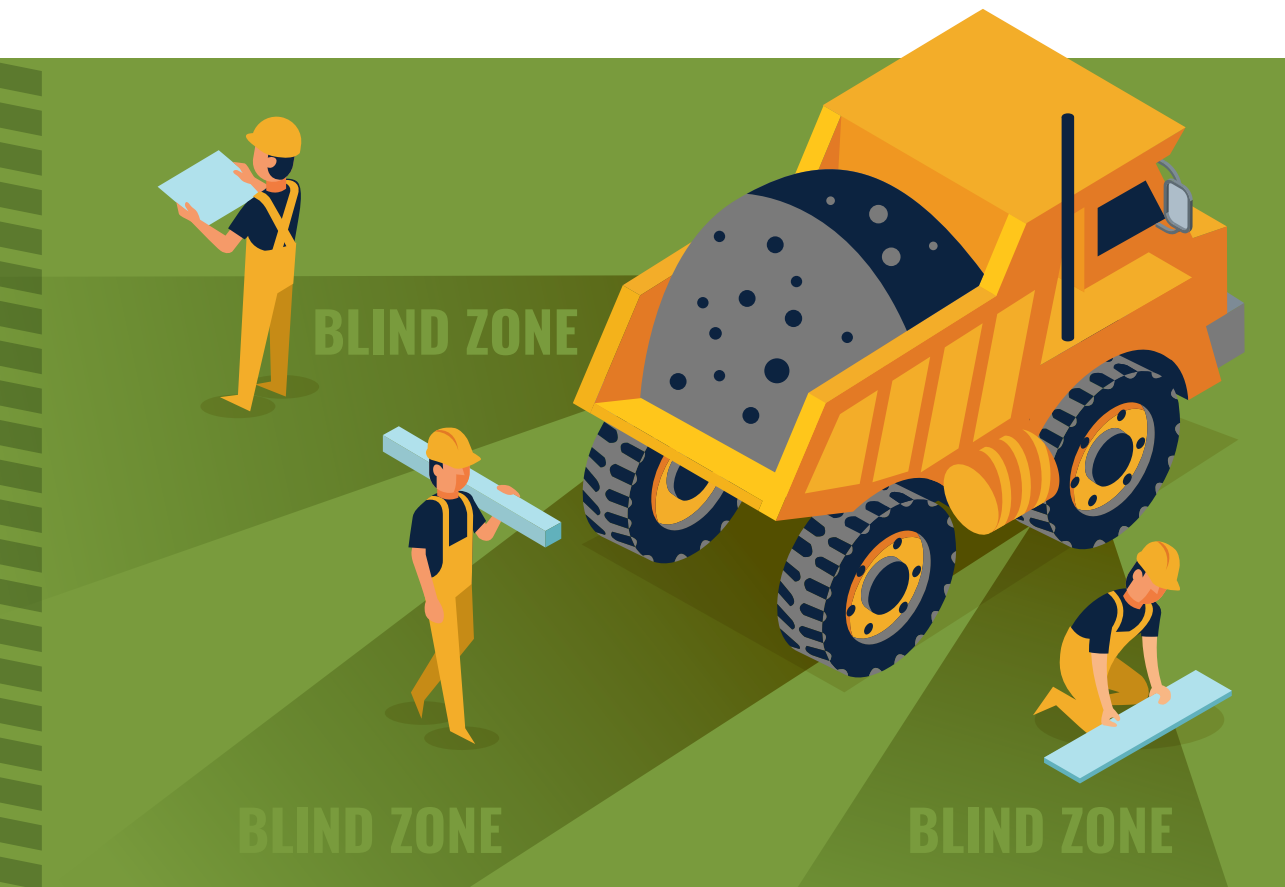
REDUCING CONSTRUCTION SITE ACCIDENTS

An in-depth look at **COLLISION MITIGATION SYSTEMS**
and how they reduce struck-by accidents from blind zones on construction sites.

INTRODUCTION

Construction site accidents are costly and can bring an entire operation to a halt. Unfortunately, these accidents are also on the rise. The U.S. Department of Labor reported that 4,386 work fatalities were investigated in 2014, 20.5% of which were in construction. Being struck by an object was one of the leading causes of construction worker deaths. According to the Occupational Safety and Health Administration, approximately 75% of **struck-by fatalities** involved heavy equipment such as trucks and bulldozers.

Why do construction accidents happen? One key reason is the **blind zone** inherent in heavy equipment. Equipment operators might not see a worker in their blind spot or they may assume that their machine's path of travel is clear. Workers on foot might not hear a vehicle's backing alarm over the surrounding noise or they may ignore it because they are focused on their own tasks.



Dump trucks are historically the most common cause of fatal struck-by blind zone injuries on construction sites, but other vehicles—including wheel loaders and telehandlers—also cause these **preventable accidents**.

THE REAL COST OF STRUCK-BY BLIND ZONE ACCIDENTS

A recent study found that **50% of construction companies** have experienced as many as five separate blind zone accidents on their worksites in the past 12 months.

Using national incidence data from the Bureau of Labor Statistics, the National Center for Biotechnology Information found that for each vehicle involved in a construction incident, **the average cost was \$44,626**.

How does a company determine the **real cost** of a blind zone accident? Direct costs are the most obvious factors, including worker's compensation, property damage, and legal fees. Less obvious factors include indirect costs like production downtime and insurance premium increases.

Determining the real cost of a blind zone accident:

Direct Costs	Indirect Costs	Intangibles
Property Damage (per vehicle): \$___	Downtime (per day): \$___	Company's Goodwill
Worker's Comp: \$___	Management Distractions: \$___	Company's Reputation
Injuries: \$___	Insurance Premium Increase: \$___	Employee Morale
Fatality/Lawsuit: \$___		
Legal Fees: \$___		

But some of the most impactful costs—the intangibles—are often overlooked: how preventable accidents affect the attitudes and opinions of employees, customers, and competitors toward the company.

The average cost of a vehicle involved construction incident:

\$44,626

THE TOLL OF STRUCK-BY ACCIDENTS IN CONSTRUCTION

Struck-by accidents are **one of the four leading causes of workplace fatalities**. Twenty-five percent of struck-by equipment deaths involve construction workers—more than any other occupation.



Employees are often backed over by heavy equipment. Even when vehicles have backup alarms, accidents occur because these **alarms are often ignored**.

A PREVENTABLE SOLUTION: SAFETY TECHNOLOGY

A common reason preventable struck-by accidents happen on construction sites and elsewhere is that **accessible safety technology is not installed or used**. Safety technology is becoming standard in the automotive industry, but not so with heavy equipment. Many OEMs now offer safety technology as a standard feature on new heavy equipment. But when the lifespan of heavy equipment is taken into consideration, it will be decades before safety equipment is standard on all working machines. **Consider retrofitting existing equipment with safety technologies**.

SAFETY TECHNOLOGIES AT WORK TO MITIGATE STRUCK-BY BLIND ZONE ACCIDENTS

Blind zone safety solutions on construction sites range from basic methods to advanced electronic technologies.

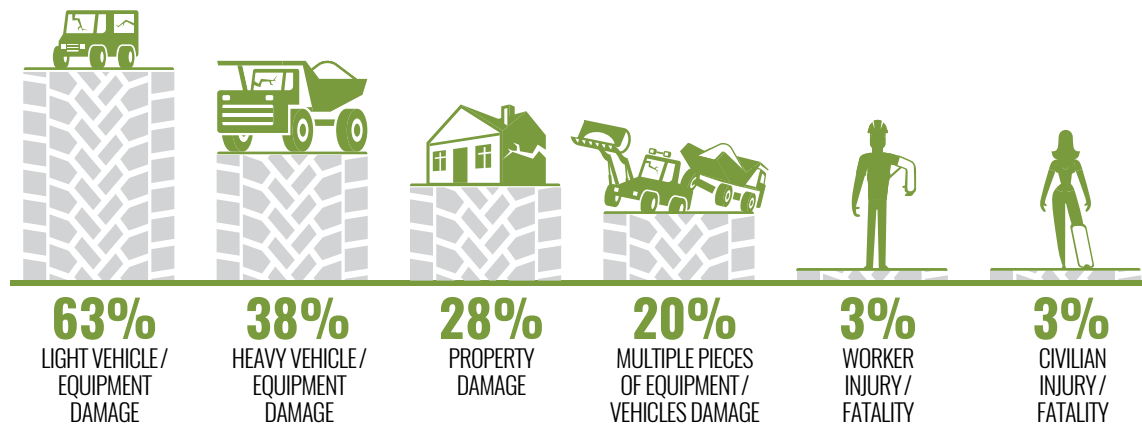
Solution	Overview
Internal Traffic Control Plans	Tell the drivers where to drive and can reduce the need to back up. In some cases, they can also be used to separate employees on foot from operating equipment.
Spotters	A proven method of protecting employees on foot behind vehicles with an obstructed view, but spotters themselves can be at risk for injury or even death.
Backup Alarms	PRECO invented the backup alarm in 1962. While still a useful tool, the sound has become SO common, that it is often ignored by workers and public alike.
Cameras	Cameras are a great tool to help operators see objects or people in their blind zones. But they require the operator to be looking at the monitor to be effective—unfortunately, this is not practical in most circumstances.
Tag-Based Systems	These systems detect people or objects wearing a reciprocating RFID 'tag.' Dangerous situations occur when people fail to wear the tag or the batteries run out.
Object Detection Systems	Radar-based systems that identify people or objects in a predefined detection zone. Operators are actively alerted (via audible alerts) of potential collisions, giving them time to react accordingly.

THE IMPACT OF STRUCK-BY BLIND ZONE ACCIDENTS

In a recent PRECO survey of construction employers and employees, **95% of participants** found that downtime due to struck-by blind zone accidents significantly affects worksite productivity.

Productivity slows or halts due to damage to equipment and property, and injuries and deaths to workers and civilians.

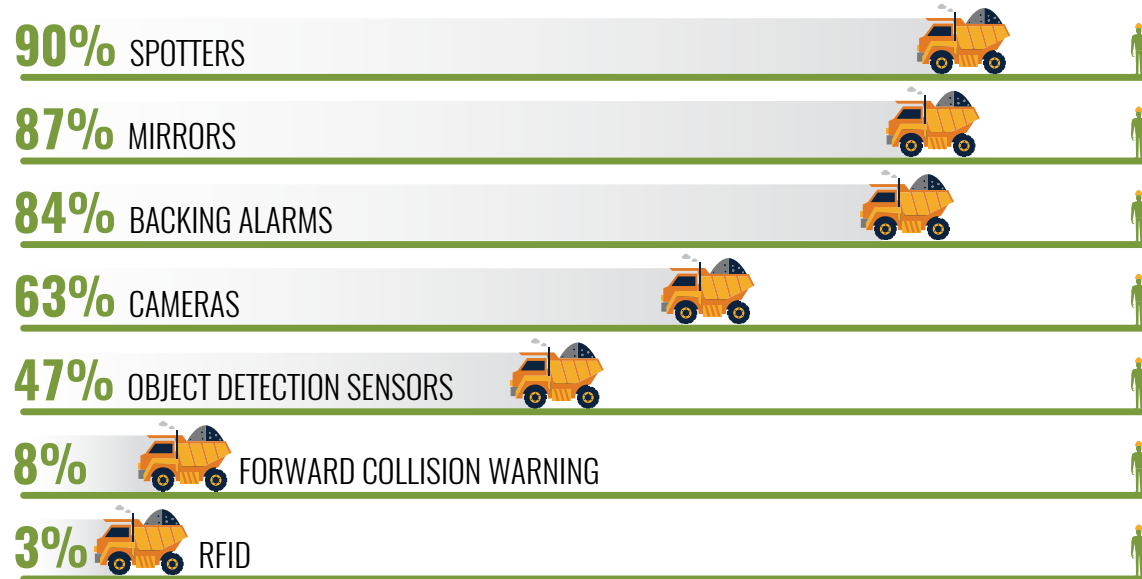
Damage from preventable struck-by accidents:



SAFETY SOLUTIONS AT WORK ON CONSTRUCTION SITES

In the PRECO survey, respondents listed the various safety technologies and measures they use to prevent accidents. The most common measures—spotters and mirrors—are hindered by equipment blind spots.

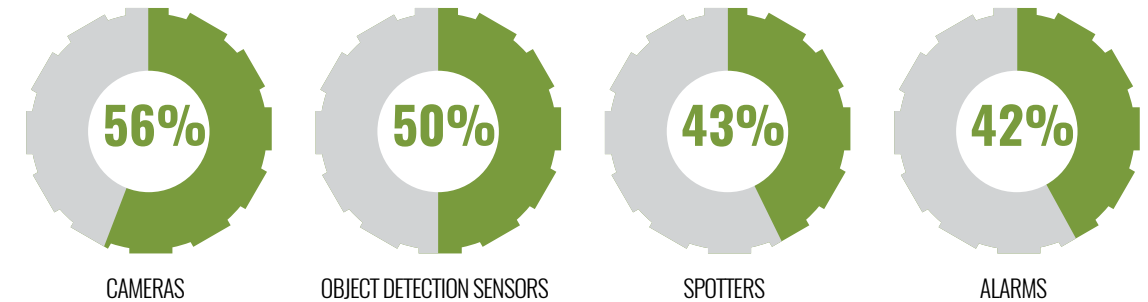
Safety measures at work:



WHICH SAFETY SOLUTIONS MITIGATE THE MOST BLIND ZONE RISKS?

Almost all safety measures used on construction sites help reduce the risk of struck-by blind zone accidents. While no single solution is fail-safe, some measures work better than others. Here are the results from the PRECO survey.

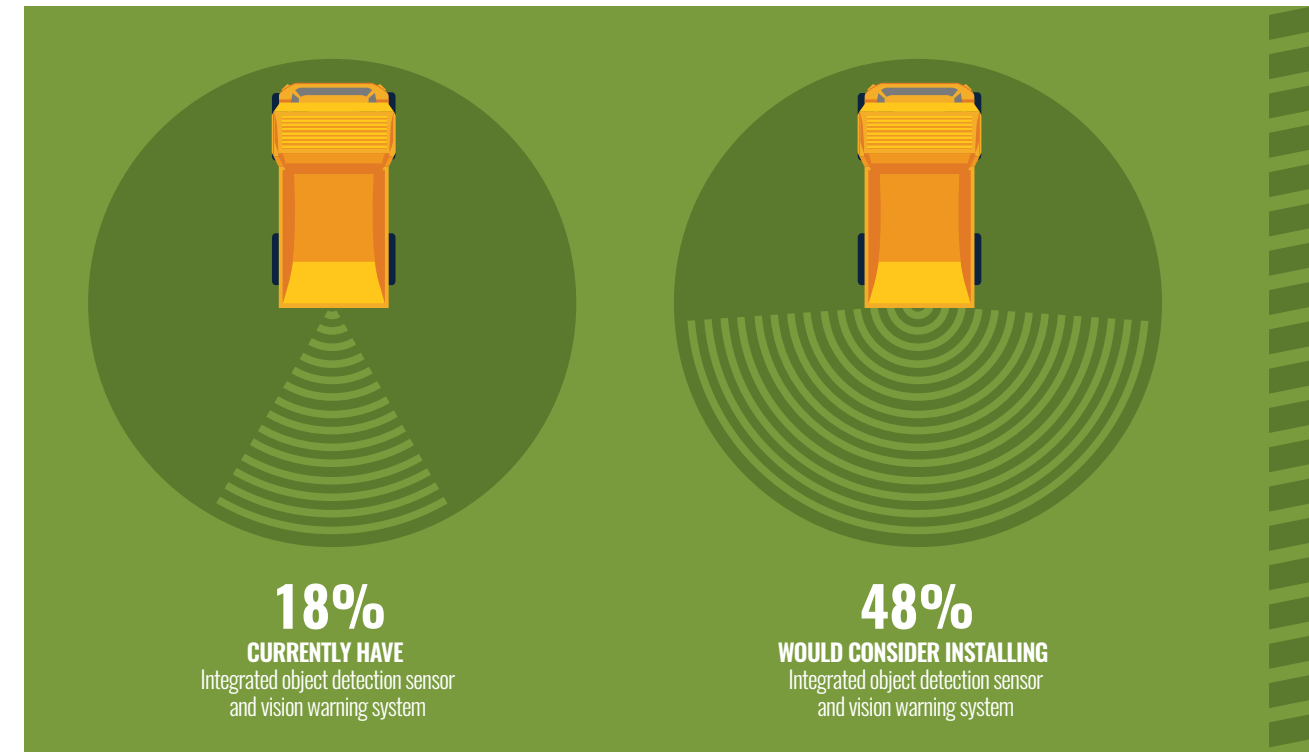
Solutions resulting in significant reduction in blind zone accidents:



SAFETY TECHNOLOGIES INSTALLED ON CONSTRUCTION EQUIPMENT

The PRECO survey participants indicated which safety technologies they currently use on construction sites, technologies they plan to install within a year, and technologies they would consider purchasing.

Construction site safety technology:



A PROVEN STRATEGY TO MITIGATE STRUCK-BY BLIND ZONE ACCIDENTS

Here are some tips to help create a safe and healthy work environment

Create a safe work environment:

Tips

- Use spotters whenever a vehicle is moving or when equipment with a restricted view is operating on site. Spotters should always position themselves where the driver can see them.
- Always practice safe operation techniques, such as ensuring employees do not use cell phones while working with and walking around heavy equipment.
- Familiarize all employees with the worksite and all vehicle operations, making sure they are aware of intersections and blind zone areas in the work zone.
- Check vehicles before each shift to ensure all parts and accessories are in safe operating condition, including brake systems, tires, emergency brakes, steering, and lights.

Every piece of heavy-duty equipment is different and there is no one-size-fits-all safety package for every vehicle type. **Object detection systems** can fill in the gaps and blind zones to help create safer worksites. By integrating radar with other active and passive technologies, the ultimate collision mitigation safety solution comes into focus.



TURNING PASSIVE SYSTEMS INTO ACTIVE SAFETY SOLUTIONS

Vision systems have become a critical part of heavy equipment safety. Currently, many OEMs offer rear visibility cameras to help companies avoid accidents and potential litigation. However, this technology is a **passive approach** to collision avoidance. That is because camera/monitor systems require the attention of the equipment operator, **putting the responsibility on the operator** to identify an obstacle or person at risk of being struck.

Active warning systems rely on sensor technology, such as object detection radar, to identify the potential danger. As soon as an object is detected, the operator receives an alert. The alert gives them the opportunity to identify the potential threat using the vision system, and then take appropriate action.

By **integrating active and passive safety solutions**, operators achieve **the best of both worlds**. Radar/vision fusion provides an object detection solution with both audible and visual alerts to actively notify an operator of potential collision danger. Regardless of where the operator's attention is directed, if an object or person is detected, the system alerts the operator, and the operator is able to **react before a potential accident occurs**.



THE ULTIMATE SAFETY SOLUTION IS ONE INSTALLATION AWAY

Installing **collision mitigation** solutions on vehicles will further help to significantly reduce struck-by accidents and fatalities. PRECO's PreView® Radar Object Detection Systems help to improve driver engagement and situational awareness in real time. Our systems are specifically designed to serve the vehicle or machine type and the blind zones that come with them. We understand that the mix of oversized equipment, service trucks, environmental conditions, and people on a construction site can create dangerous conditions, which is why our systems actively warn of potential collisions with both moving and stationary objects.



PreView Sentry™



PreView WorkSight®



PreView Plus

To receive a specialized quote, talk to a PRECO Safety Specialist today.

Call us toll free: **866.977.7326** | Email us: info@PRECO.com | Visit us online: www.PRECO.com

Sources

Occupational Safety and Health Administration (OSHA)

<https://www.osha.gov/doc/topics/backover/spotter.html>

<https://www.osha.gov/doc/topics/backover>

National Center for Biotechnology Information (NCBI)

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2491397>

THE FUTURE OF COLLISION MITIGATION IS BRIGHT

Advanced driver assistance systems (ADAS) technology is **active machine control** that gets us one step closer to full equipment autonomy. ADAS combines active alerts that **aid**, **warn**, and **assist** operators of heavy-duty equipment to navigate and avoid collisions.

ADAS:



AID

Using a camera and monitor system to cover rear or side blind spots



WARN

Using an object detection system, such as radars, to detect objects and alert the driver



ASSIST

Using active braking technology to avoid forward-facing collisions

Improvements currently being made in radar technology will soon allow operators not only to receive an alert when something is in their blind zone, but also determine how far away the object is, the velocity at which it is moving toward the operator, and its location.

ADAS will continue to improve as radar technology becomes more flexible and adaptive. PRECO plays an integral role in the advancement of safety technology solutions in today's market, and is well positioned as the market evolves into semi and eventually full autonomy.



PRECO believes that those responsible for heavy equipment operations have a desire to keep the people and property free and safe from harm. We design, engineer, and manufacture collision mitigation technology optimized for heavy equipment. Our safety products have survived the industry's most rigorous testing for unstoppable performance in the harshest working conditions imaginable, so that operators can perform with greater confidence and peace of mind.

PRECO. Heavy-Duty Safety Solutions Worldwide.

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