

28 BACKING UP

Reversing vehicles and equipment on construction projects pose a serious problem for personnel on foot.

Fatal accidents resulting from workers being backed over by dump trucks and other equipment occur all too frequently.

Anyone on foot in the vicinity of reversing vehicles and equipment is at risk. More than 20 deaths have occurred on construction sites over a ten-year period as a result of reversing vehicles.

Blind Spots

The main problem with reversing vehicles and equipment is the driver or operator's restricted view.

Around dump trucks and heavy equipment such as bulldozers and graders there are blind spots where the operator has no view or only a very limited view.

The operator may not see someone standing in these blind spots. Anyone kneeling or bending over in these areas would be even harder to see.

Consequently the driver or operator must rely on mirrors or signallers to back up without running over someone or into something. Figure 1 shows the blind spots for common types of construction equipment.

Dump trucks and cranes are the kinds of equipment that hit overhead powerlines most often. Beware of powerline contact whenever a crane, dump truck, or other vehicle is going to be operated near an overhead electrical conductor. If equipment operates within reach of (and could therefore encroach on) the minimum permitted distance from an overhead powerline (see the chapter on Electrical Hazards in this manual), the constructor is required to have written procedures in place to prevent the equipment from encroaching on the minimum distance.

Accident Prevention

To prevent injuries and deaths caused by vehicles and equipment backing up, there are four basic approaches:

- 1) site planning
- 2) signallers
- 3) training
- 4) electronic devices.

Site planning

Wherever possible, site planners should arrange for drive-through operations to reduce the need for vehicles to back up (Figure 2).

Foot traffic should be minimized where trucks and equipment operate in congested areas such as excavations. Where feasible, a barricade can help to

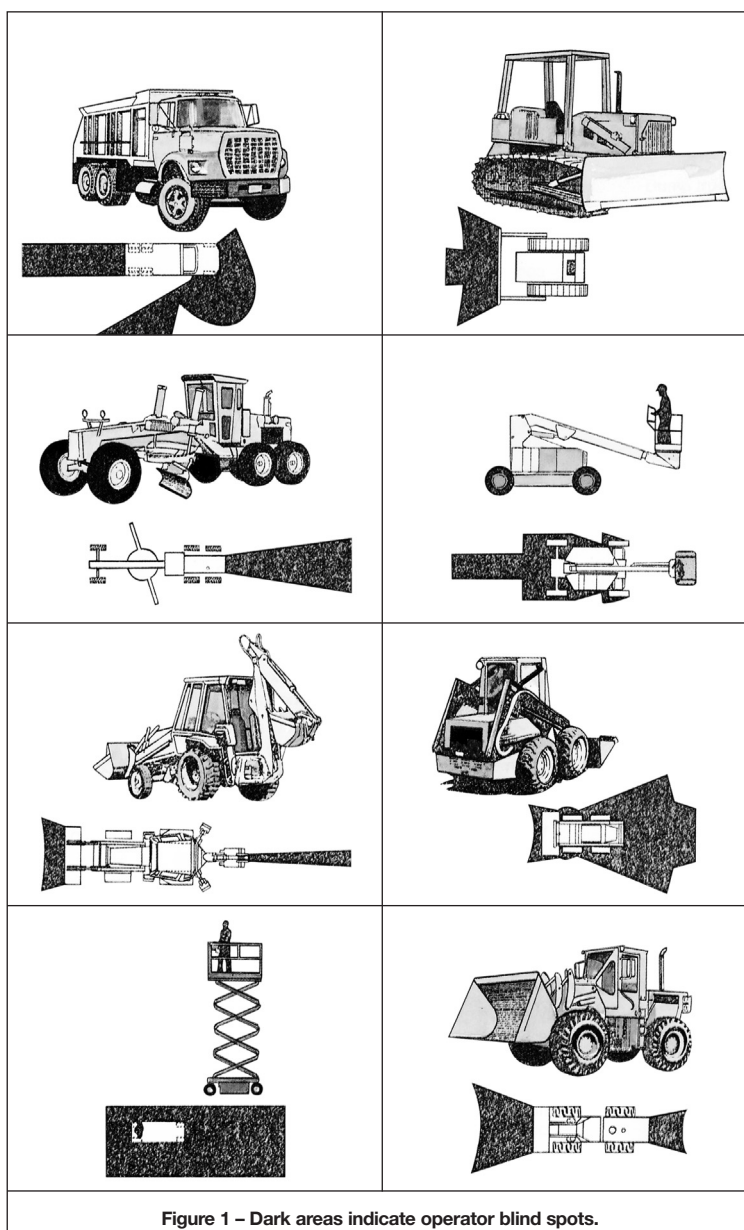


Figure 1 – Dark areas indicate operator blind spots.

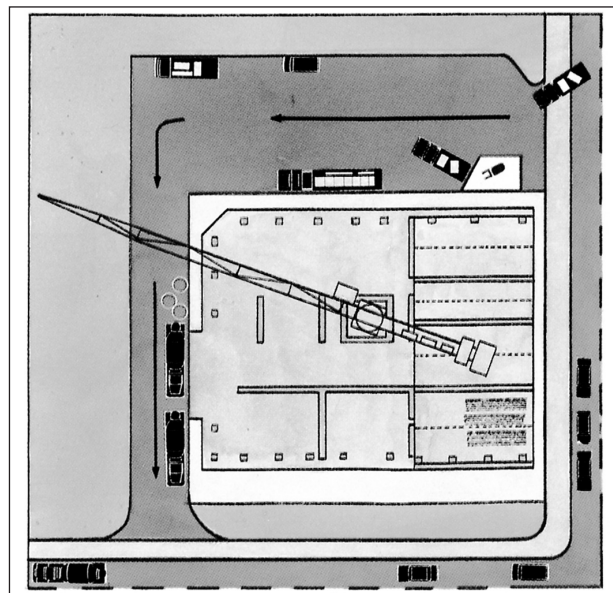


Figure 2

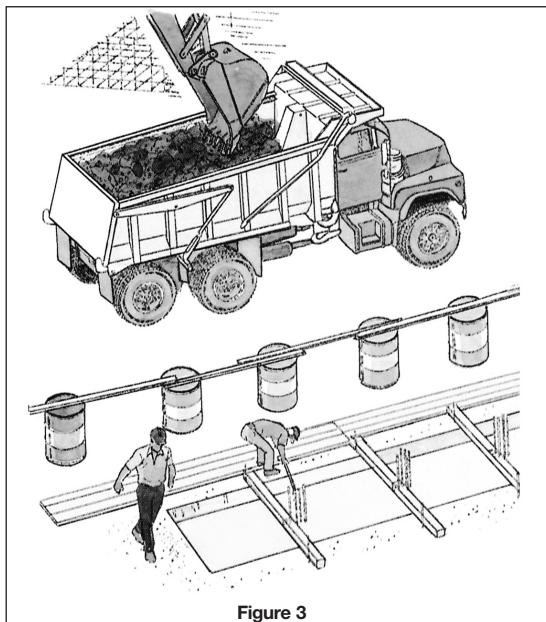


Figure 3

protect workers: (e.g., by keeping excavation work separate from forming operations as in Figure 3.)

The hazards of reversing vehicles can also be reduced through separate access for workers on foot. Where possible, for instance, a scaffold stair system should be provided for worker access to deep excavations.

Near loading and unloading areas, pedestrian walkways can be roped off or barricaded.

Signallers

On some projects, you cannot avoid having reversing vehicles or equipment on site. Often, they must share an area with other vehicles and operating equipment—as well as workers on foot.

You must have a signaller or spotter when

- a vehicle or equipment operator's view of the intended path of travel is obstructed
- a person could be endangered by the operation of the vehicle or equipment, or by its load
- any part of the equipment could encroach on the minimum distance to an overhead powerline (see the chapter on Electrical Hazards in this manual for minimum distances).

A signaller must be a competent worker and must not have any other duties to fulfill while acting as a signaller.

Before a worker can act as a signaller, the employer must ensure that the worker has been given adequate oral and written instructions in a language that he or she understands. The employer must keep on site a copy of the written instructions and a record of the worker's training.

A signaller must wear a garment—usually a nylon vest—that is fluorescent or bright orange, with 2 vertical 5-centimetre-wide yellow stripes on the front and 2 similar stripes forming a diagonal "X" pattern on the back. These stripes must be retro-reflective and fluorescent. The vest must have an adjustable fit and have a front and side tear-away feature.

If a signaller has to work during the night, he or she must wear retro-reflective silver stripes around each arm and leg.

The signaller must maintain clear view of the path that the vehicle, machine, or load will be travelling and must be able to watch those parts of the vehicle, equipment, or load that the operator cannot see. The signaller must maintain clear and continuous visual contact with the operator at all times while the vehicle or equipment is moving (Figure 4), and must be able to communicate with the operator using clearly understood, standard hand signals (Figure 5). The signaller must warn other workers on foot of the approaching vehicle or equipment, and must alert the operator to any hazards along the route.



Figure 5

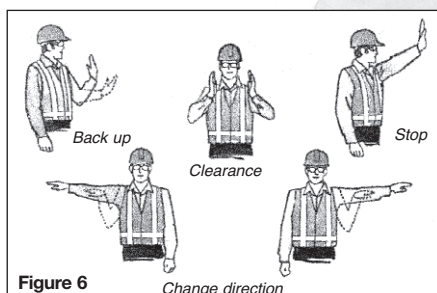
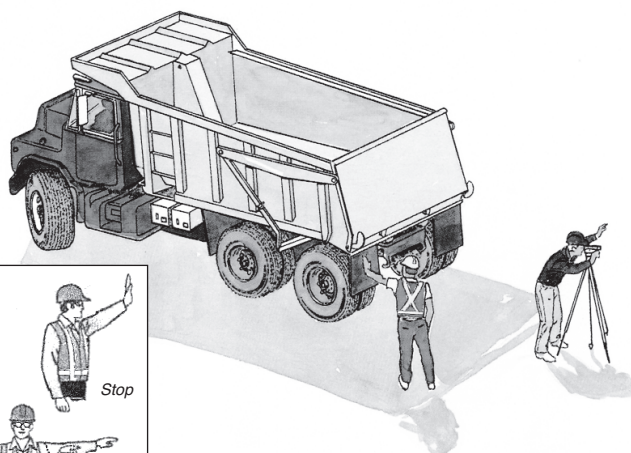


Figure 6

Change direction

Training

Instruction for drivers, operators, signallers, and workers on foot is essential to reduce the hazards created by reversing vehicles and equipment.

For example, all construction personnel must be made familiar with blind spots—the areas around every vehicle that are partly or completely invisible to the operator or driver, even with the help of mirrors (Figure 1).

Specific training can then focus on the following points.

Workers on Foot

- Know how to work safely around trucks and operating equipment.
- Understand the effect of blind spots (Figure 7).
- Avoid entering or standing in blind spots.
- **Make eye contact with the driver or operator before approaching equipment.**
- Signal intentions to the driver or operator.
- When possible, use separate access rather than vehicle ramps to enter and exit the site.
- Avoid standing and talking near vehicle paths, grading operations, and other activities where heavy equipment is moving back and forth.

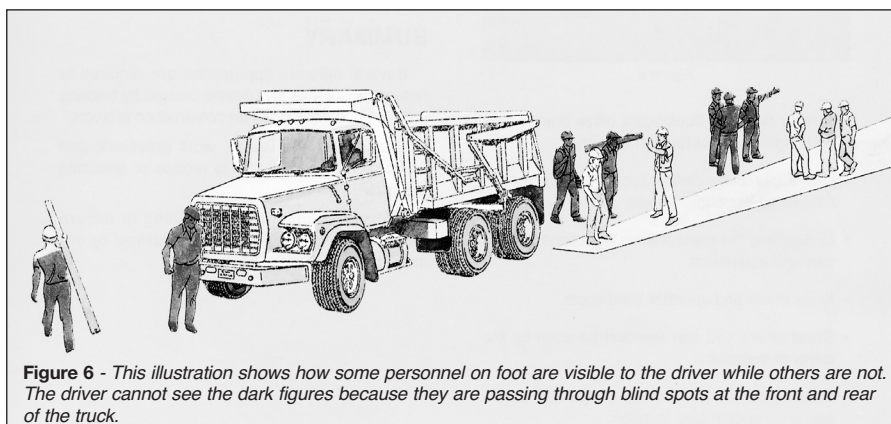


Figure 6 - This illustration shows how some personnel on foot are visible to the driver while others are not. The driver cannot see the dark figures because they are passing through blind spots at the front and rear of the truck.

- Stand where you can see and be seen by the driver or operator.
- Make eye contact with driver or operator before signalling or changing location.

Drivers and Operators

- Always obey the signaller or spotter. If more than one person is signalling, stop your vehicle and determine which one to obey.
- If possible, remain in the cab in areas where other equipment is likely to be backing up.
- Make sure that all mirrors are intact, functional, and properly adjusted for the best view.
- Blow the horn twice before backing up.
- When no spotter is present, get out and quickly walk around your vehicle. If the way is clear, back up at once (Figure 7).
- Stop the vehicle when a spotter, worker, or anyone else disappears from view.

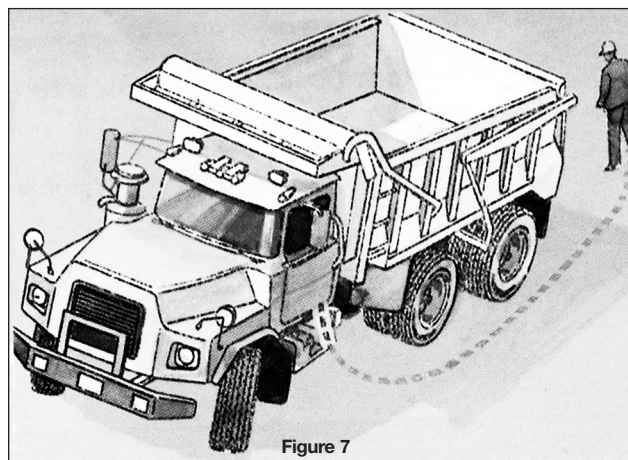


Figure 7

Electronic Devices

Since 2000, automatic audible alarms that signal when a vehicle is being operated in reverse have been required on dump trucks.

Alarms offer the greatest benefit when traffic is limited to only one or two vehicles. The warning effect of the alarm is greatly reduced, however, when it simply becomes part of the background noise on-site.

This is a common shortcoming with devices that sound continuously when the transmission is put in reverse, especially in areas where several vehicles are operating at once.

Newer devices using a type of radar to sense objects or people within a pre-set radius appear to be more effective but are not readily available or widely used.

Other technologies such as infrared or heat sensors and closed-circuit television are limited by the effects of vibration, dust, and dirt—conditions all too common on construction sites.

Signallers

- Stay alert to recognize and deal with dangerous situations.
- Know and use the standard signals for on-site traffic (Figure 5).
- Wear a reflective fluorescent or bright orange vest and a bright hard hat for high visibility.
- Use a signalling device such as a bullhorn in congested excavation areas.
- Understand the maneuvering limitations of vehicles and equipment.
- Know driver and operator blind spots.