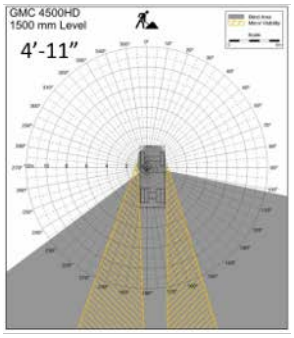
Equipment Visibility and Blind Spots

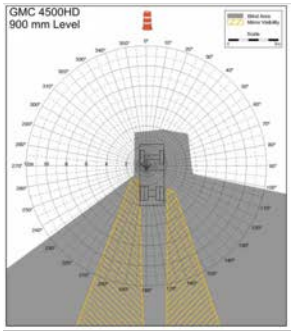
Tailgate Safety Talk

Equipment used in roadway construction and maintenance crashes with other equipment, fixed objects, and people with a surprising frequency. Thankfully, the equipment typically backs into or runs over an inanimate object, resulting only in property damage (no relief to the operator, of course, who probably has to go provide a "sample" and then talk to some people), but personal injuries can happen and even fatalities. These runovers and backovers are largely preventable by a better understanding of operator visibility limitations and good practices.

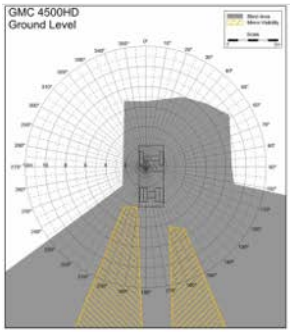
We are running over each other. An average of 772 total fatalities occurred in construction and maintenance zones from 2015-2017. From 2003-2017, 1,844 workers lost their lives at road construction sites, for an average of 123 per year. In the Federal Highway Administration's Worker Safety resource page, we learn that the primary causes of worker fatalities in recent years included runovers and backovers (48%, often by dump trucks), collisions between vehicles/mobile equipment (14%), and being caught between or struck by construction equipment and objects (14%).



Blind spots can be huge areas around equipment. Some of these crashes can be explained by large areas around equipment that the operator cannot see and the lack of situation awareness of workers on the ground that find themselves in the pathway. See a typical NIOSH figure to the right.



For the truck design, size, and configuration shown, the three "look down" or "plan" view figures represent the field of view likely for the operator and a gray area representing the "blind spot). The yellow hatched area represents the area the operator can see using mirrors. The first figure shows the gray area that the operator cannot see on the ground; notice the large area in front of the truck, biased to the right side, and a large sweeping area behind the truck, compensated to some degree by the mirrors. The second figure in each series shows the gray area where the operator cannot see an object that is 900 mm above ground (`35 inches), typical of a temporary traffic control channelizing device, such as a traffic drum. Notice the area is smaller in

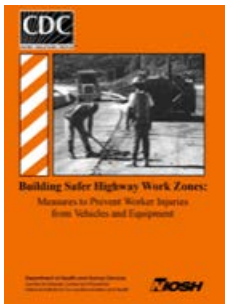


the front at this level, but typically unchanged to the side and rear – in the front, the hood configuration heavily influences the field of view at various heights. The third figure illustrates the field of view for spotting a 1,500 mm (~4'-11") object – imagine a shorter worker or a taller worker hunched over somewhat with a work task, like shoveling. Again, you see the blind spot diminish dramatically in the front, but largely unchanged to the rear and sides.

Things change quickly in our world. In the time it takes to bend down and re-tie your boot, a truck or loader can back over you.

Think about your risks. What are the things you might be doing as a ground-level worker immediately in front of a truck, to one side or another, at the rear? Connecting or servicing a snowplow, inspecting lights, pulling limbs/debris out from under the truck? Inspecting/adjusting a salt spreader or connecting a trailer? Inspecting brake lines, fueling the truck, or just finding some shade? All of these and more can put you out of sight of an operator in the cab of the truck, loader, excavator, skid steer, or other piece of equipment. Do you think your whole crew could hide from the operator behind one of your dump trucks (try it) – that's a big area with ample opportunity to get into trouble if you aren't paying attention.

Think you're too quick to get caught? Don't be so sure. Read some of the case examples in NIOSH's "Building Safer Highway Work Zones: Measures to Prevent Worker Injuries from Vehicles and Equipment." There is case after case detailed where (often experienced) workers were fatally run over by dump trucks, pickup trucks, derrick trucks, front end loaders, excavators, and even an asphalt paver and a milling machine.



Good safety practices for workers on foot around moving equipment:

- Always wear high visibility apparel that is appropriate for your job task and work environment.
- Tie your shoes (and pull up your pants and get your hands out of your pocket).
- Be aware of equipment and vehicle blind areas, and avoid being near these areas.
- Confirm communications signals with an operator and do not approach until the operator gives acknowledgment.
- Always maintain eye contact with equipment operators – good pedestrian behavior rules.
- Be aware of equipment travel paths and avoid standing or walking in these areas.
- Listen for reverse signal alarms in the area.
- Always be situationally aware.
- Do not rely solely on one safety practice; always be aware of your surroundings and ensure that other workers are aware of you.

National LTAP & TTAP Association
Tailgate Talks