Equipment rollovers

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Since the year 2000, nine workers have been killed by equipment or vehicles rolling over. Rollovers can injure or kill both equipment operators and workers unlucky enough to be nearby.

Here's how to prevent injury and death from rollover.

Stay inside the ROPS

A roll-over protective structure, or ROPS, is a protective cage or sturdy frame mounted on the equipment around the cab. In case of rollover, you'll be safe if you stay inside the ROPS. That's why you need to wear the seatbelt.

Wear your seatbelt

To be protected by a ROPS, you must wear a seat belt at all times while the equipment is operating. Workers have been crushed by the machine—even by the ROPS itself—during a rollover after they were thrown from the cab because they weren't wearing the seatbelt.

Never operate equipment if it doesn't have a seatbelt or if the seatbelt isn't working properly. A working restraining device must be installed before you can use the equipment.

Know your equipment's centre of mass

Every object has a centre of mass. It's the point where the object's weight is evenly distributed in all directions. It's usually where most of the material is concentrated.

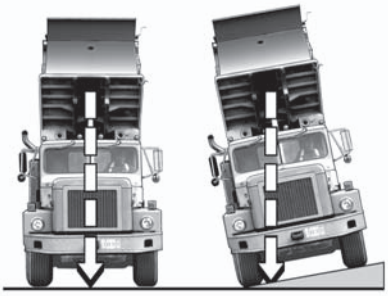
You can balance the object if you place it on a support such that the centre of mass is directly above the point of support. In the same way, a vehicle is balanced if the centre of mass is directly above the wheels.

Know the law

Ontario law forbids you from operating a machine unless it has an adequate ROPS. There also has to be an adequate "restraining device" (usually a seatbelt) for every operator. If the equipment has a restraining device, you must wear it. For details, see Roll-over Protective Structures (Ontario Regulation 856), available on www.csao.org.

Here are some conditions which can cause a vehicle to become unbalanced and tip:

- The centre of mass shifts to one side. This can happen if you change the machine's distribution of mass by changing the machine's configuration, (e.g., by extending a boom or moving an excavator arm).
- You drive on a slope. This moves the centre of mass relative to the equipment's wheels. (See image below.) Gravity will act on the mass, pulling the vehicle to the side.



Don't jump!

Never try to jump clear of a tipping machine. Workers have been crushed trying to do so. The machine will tip over faster than you can jump free. Also, the most natural way to jump free is in the direction of the roll—so you would actually be jumping into the path of the equipment.

➤ You take a turn too quickly. The momentum of one part of your machine (e.g., a loaded dump-truck box) can be greater than another part (e.g, the cab and frame), leading to rollover.

Beware of slopes

- ✓ When working on an embankment never operate cross grade. Always operate in the direction of grade.
- ✓ When using a crane, excavator, backhoe, or elevated work platform, use the outriggers and extend them fully.
- ✓ If possible, work "down slope" of a trench so that in case of rollover, the equipment will not roll into the trench.
- ✓ Stay as far away as possible from the edge of a trench or excavation. Equipment weight and vibration can cause excavation walls to collapse.
- ✓ Establish and mark access routes. For example, when working around an embankment, have properly sloped and marked equipment access routes from the top to the bottom of the embankment.
- ✓ When driving your equipment on a road, remember that you're not in a car. Your equipment may be less stable or responsive than a car, so avoid soft shoulders and any sudden or abrupt movements.

Plan the site

Equipment operators are not the only workers who can be killed by rollover. People working near the equipment can be hurt or killed as well, such as when equipment rolls from uneven ground and hits workers lower down on embankments or in excavations.

There are several ways to protect workers in low-lying areas. The best and simplest policy is to forbid anyone from working in trenches or excavations when equipment is operating in the area. If this policy is not practical on your site, you need to incorporate controls into your site plan:

- ✓ Keep heavy equipment away from areas where work is being done in trenches or excavations. For example, keep excavation work separate from forming operations.
- ✓ Use ropes or barricades to mark off trenches, excavations, and equipment access ways. These indications can help equipment operators be aware of the different areas on site as well as the safe paths of travel.
- ✓ Forbid workers from being in a trench unless there is another person, nearby and above ground, who is responsible for warning equipment operators about the presence of the trench.

Monitor ground conditions

Ground and soil conditions affect the stability of your equipment.

Rain, melting snow, thawing earth, or even overflow from nearby streams, storm drains, or sewers can change the condition of the ground—especially for previously excavated and backfilled soil.

These changes can occur rapidly and the result can be severe. In the morning you could be operating on solid ground and later the same day the ground could be unstable.

In previously excavated and backfilled soil, the conditions can change as things settle with the passage of time. Non-native backfill can be less stable than native material.

For these reasons, monitor ground conditions throughout the day. Pay particular attention to backfilled trenches, graded embankments, and laydown areas. ■