WorkSafe Bulletin

Stability and handling hazards of driving trucks and trailers with live loads

A mechanic was driving a truck carrying a live load of bulk liquid on a public roadway. As the vehicle descended a curved and inclined section of the road, the truck rolled onto its side and crashed into a power pole. The mechanic was taken to hospital and later died.

Employers must provide workers with information, orientation, and training specific to live loads if they will be transporting them even for short distances. Consider engineering requirements for live-load tanks mounted on trucks if the trucks have not been specifically designed for such loads.

What is a live load?

A live load in this context is one in which a tank contains a liquid, such as water, brine, oil, or milk. Live loads are found in many industries, including road maintenance, oil and gas, transportation services, manufacturing, and agriculture. A variety of vehicles carry live loads, including large commercial vehicles (e.g., tanker trucks) and smaller vehicles that carry bulk containers on cargo beds or trailers. During winter months, some highway maintainers use truck-mounted tanks to spray brine that is denser than water on roadways for ice control.

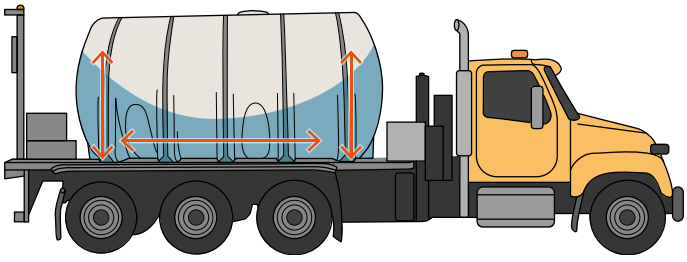
What are the hazards?

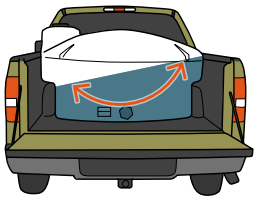
Whenever there's a live load, there are additional driving hazards that need to be considered. For example, the load can affect the vehicle's handling and stability.

With conventional loads, the weight of the load is applied downward onto the wheels and axles of the truck or trailer. Conventional loads move together with the vehicle that is carrying them.

With live loads, the fluid in a tank can move from side to side and forward and backward as the truck moves. Fluid moving in large tanks can affect a worker's ability to steer, brake, handle, and control the vehicle while it's in motion. This can be even more pronounced with partially filled loads.

The risk of a rollover increases with large commercial vehicles, such as brine trucks, carrying fluids in large tanks. They can be especially sensitive to load movements with sudden changes in speed or direction.





The arrows indicate how the weight of a live load and its centre of gravity can shift. Liquid sloshing around in the tank can have a significant effect on the vehicle's handling and stability.

Managing risks

Employers are responsible for **managing risks** associated with transporting live loads. Risk assessments will help identify and determine the types of risk controls that are needed to keep workers safe.

Engineering considerations

It's important to check the truck manufacturer's written instructions before mounting any tank on a truck. If a truck manufacturer has not considered the use of a tank for live loads, the employer is required to consult a professional engineer to ensure safe tank installation.

Engineering considerations that may help improve stability include:

- Limiting the number and size of tanks
- Considering the positions of tanks on the truck
- Lowering the centre of gravity
- Using devices such as baffles that reduce sloshing of the liquid

Rated capacity

A professional engineer may need to establish the rated capacity for a liquid load if the truck was not originally designed to carry live loads.

An engineer should consider the destabilizing effects of:

- Various truck speeds
- Roadway curves and slopes
- The absence of baffles
- Higher centres of gravity from variations in the height of liquid in tanks
- Varying liquid densities
- Other attachments such as front or wing plows
- Heavily loaded or under-inflated tires
- Axles not properly sharing vehicle loads

Supervision, training, and competency

Part of employers' responsibility for ensuring the health and safety of their workers is making sure that workers who transport live loads receive information, orientation, and training to address the additional driving hazards. It's also important to provide ongoing supervision to make sure workers follow their instruction and training.

Training topics

Training topics should include the following:

- How live loads can affect a vehicle's stability and handling
- Where to find load capacity information on each vehicle
- How to determine the weight of a load to make sure it doesn't exceed the gross vehicle weight specified by the manufacturer or a professional engineer

Assessing competency

There should be a procedure in place for assessing a worker's competency to transport live loads. It's not enough just to be licensed and trained. The worker should also be experienced with the vehicle being used, be able to demonstrate an ability to safely operate it, and be familiar with the potential hazards of live loads.

Right to refuse unsafe work

Workers who think their training has been inadequate need to report their concerns to a supervisor with the authority to make necessary changes.

Workers have the right and responsibility to refuse unsafe work. Workers must not carry out any task that they have reasonable cause to believe may create an undue hazard to the health and safety of any person.

Regulatory requirements

In the *Workers Compensation Act*, refer to **Section 21**. In the Occupational Health and Safety Regulation, refer to sections **3.10**, **3.12**, **4.3(2)(b)**, **4.7**, **4.8**, and **4.10**.

To learn more about the basics of workplace health and safety, visit **worksafebc.com/create-manage**.