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## Forklift Safety: Newsletter



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**ANSI/ASSE Z490.1** *Criteria for Accepted Practices in Safety, Health, and Environmental Training*

### Transporting Liquids: Watch Out for Slosh

Every load has unique characteristics that an operator needs to take into consideration before moving it. Transporting liquids offers a prime example.

Recently a student in one of my classes illustrated this point. He used to operate a tanker truck and told the class that transporting liquid in a partially filled tank greatly changes the stopping characteristics of the vehicle.



Specifically when the truck decelerates, (assuming there are no baffles in the tank and the liquid has a low viscosity) the liquid sloshes forward. When the truck stops, the liquid sloshes back and piles up against the rear of the tank. Then the liquid sloshes forward again, sometimes with enough force to push the truck into the intersection.

How is that possible? A tanker truck might hold, say 4,000 gallons and water weighs about 8 pounds per gallon. If there is 2,000 gallons in my tank I would have 16,000 lbs. suddenly rushing from one end of the tank to the other which would generate a considerable force.



to side which increases the likelihood of a tip over.

So, what does this have to do with forklifts? On occasion forklifts sometimes carry totes or tanks containing liquid. When a forklift picks up a tank it is usually perpendicular to the direction of travel which seemingly would mitigate the tendency to slosh back and forth but it increases the tendency for the liquid to slosh from side

Along with the motion of the tank, there may be a variety of other factors that contribute to the sloshing of the liquid such as rough terrain, sharp turns, hard braking, driving over objects, or crossing a railroad track at an angle (which is an OSHA requirement).

So, the next time you have to move a partially-filled tank, consider how the liquid might slosh during transport and how those dynamic forces can increase the chances of a tip over. Then look at your intended path of travel and operate your forklift in a manner and speed that minimizes the effect of the sloshing forces.

