

3. What three methods can you use to secure a second trailer before coupling?
4. How do you check to make sure trailer height is correct before coupling?
5. What do you check when making a visual check of coupling?
6. Why should you pull a dolly out from under a trailer before you disconnect it from the trailer in front?
7. What should you check for when inspecting the converter dolly? The pintle hook?
8. Should the shut-off valves on the rear of the last trailer be open or closed? On the first trailer in a set of doubles? On the middle trailer of a set of triples?
9. How can you test that air flows to all trailers?
10. How do you know if your converter dolly is equipped with antilock brakes?

These questions may be on your test. If you can't answer them all, re-read Section 7.

Section 8 TANK VEHICLES

This Section Covers

- Inspecting Tank Vehicles
- Driving Tank Vehicles
- Safe Driving Rules

This section has information needed to pass the CDL knowledge test for driving a tank vehicle. (You should also study Sections 2, 5, 6, and 9). A tank endorsement is required for certain vehicles that transport liquids or gases. The liquid or gas does not have to be a hazardous material. A tank endorsement is only required if your vehicle needs a Class A or B CDL and you want to haul a liquid or liquid gas in a permanently mounted cargo tank rated at 119 gallons or more or a portable tank rated at 1,000 gallons or more.

Before loading, unloading, or driving a tanker, inspect the vehicle. This makes sure that the vehicle is safe to carry the liquid or gas and is safe to drive.

8.1 – Inspecting Tank Vehicles

Tank vehicles have special items that you need to check. Tank vehicles come in many types and sizes.

You need to check the vehicle's operator manual to make sure you know how to inspect your tank vehicle.

8.1.1 – Leaks

On all tank vehicles, the most important item to check for is leaks. Check under and around the vehicle for signs of any leaking. Don't carry liquids or gases in a leaking tank. To do so is a crime. You will be cited and prevented from driving further. You may also be liable for the clean up of any spill. In general, check the following:

Check the tank's body or shell for dents or leaks. Check the intake, discharge, and cut-off valves. Make sure the valves are in the correct position before loading, unloading, or moving the vehicle. Check pipes, connections, and hoses for leaks, especially around joints. Check manhole covers and vents. Make sure the covers have gaskets and they close correctly. Keep the vents clear so they work correctly.

8.1.2 – Check Special Purpose Equipment

If your vehicle has any of the following equipment, make sure it works:

- Vapor recovery kits.
- Grounding and bonding cables.
- Emergency shut-off systems.
- Built in fire extinguisher.

Never drive a tank vehicle with open valves or manhole covers.

8.1.3 – Special Equipment

Check the emergency equipment required for your vehicle. Find out what equipment you're required to carry and make sure you have it (and it works).

8.2 – Driving Tank Vehicles

Hauling liquids in tanks requires special skills because of the high center of gravity and liquid movement. See Figure 8.1.

8.2.1 – High Center of Gravity

High center of gravity means that much of the load's weight is carried high up off the road. This makes the vehicle top-heavy and easy to roll over. Liquid tankers are especially easy to roll over. Tests have shown that tankers can turn over at the speed limits posted for curves. Take highway curves and

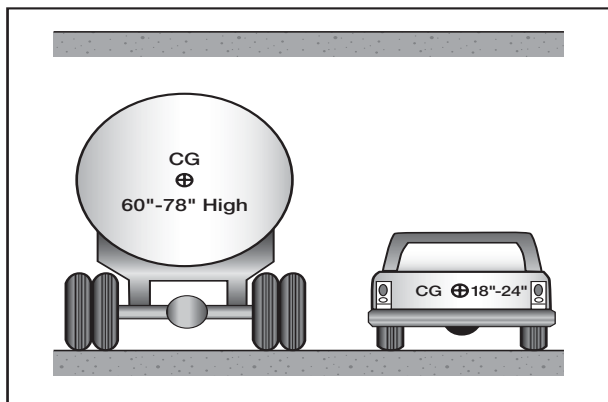


Figure 8.1

on ramp/off ramp curves well below the posted speeds.

8.2.2 – Danger of Surge

Liquid surge results from movement of the liquid in partially filled tanks. This movement can have bad effects on handling. For example, when coming to a stop, the liquid will surge back and forth. When the wave hits the end of the tank, it tends to push the truck in the direction the wave is moving. If the truck is on a slippery surface such as ice, the wave can shove a stopped truck out into an intersection. The driver of a liquid tanker must be very familiar with the handling of the vehicle.

8.2.3 – Bulkheads

Some liquid tanks are divided into several smaller tanks by bulkheads. When loading and unloading the smaller tanks, the driver must pay attention to weight distribution. Don't put too much weight on the front or rear of the vehicle.

8.2.4 – Baffled Tanks

Baffled liquid tanks have bulkheads in them with holes that let the liquid flow through. The baffles help to control the forward and backward liquid surge. Side-to-side surge can still occur. This can cause a roll over.

8.2.5 – Un-baffled Tanks

Un-baffled liquid tankers (sometimes called “smooth bore” tanks) have nothing inside to slow down the flow of the liquid. Therefore, forward-and-back surge is very strong. Un-baffled tanks are usually those that transport food products (milk, for example). (Sanitation regulations forbid the use of baffles because of the difficulty in cleaning the inside of the

tank.) Be extremely cautious (slow and careful) in driving smooth bore tanks, especially when starting and stopping.

8.2.6 – Outage

Never load a cargo tank totally full. Liquids expand as they warm and you must leave room for the expanding liquid. This is called “outage.” Since different liquids expand by different amounts, they require different amounts of outage. You must know the outage requirement when hauling liquids in bulk.

8.2.7 – How Much to Load?

A full tank of dense liquid (such as some acids) may exceed legal weight limits. For that reason, you may often only partially fill tanks with heavy liquids. The amount of liquid to load into a tank depends on:
The amount the liquid will expand in transit.
The weight of the liquid.
Legal weight limits.

8.3 – Safe Driving Rules

In order to drive tank vehicles safely, you must remember to follow all the safe driving rules. A few of these rules are:

8.3.1 – Drive Smoothly

Because of the high center of gravity and the surge of the liquid, you must start, slow down, and stop very smoothly. Also, make smooth turns and lane changes.

8.3.2 – Controlling Surge

Keep a steady pressure on the brakes. Do not release too soon when coming to a stop.

Brake far in advance of a stop and increase your following distance.

If you must make a quick stop to avoid a crash, use controlled or stab braking. If you do not remember how to stop using these methods, review subsection 2.17.2. Also, remember that if you steer quickly while braking, your vehicle may roll over.

8.3.3 – Curves

Slow down before curves, then accelerate slightly through the curve. The posted speed for a curve may be too fast for a tank vehicle.

8.3.4 – Stopping Distance

Keep in mind how much space you need to stop your vehicle. Remember that wet roads double the normal stopping distance. Empty tank vehicles may take longer to stop than full ones.

8.3.5 – Skids

Don't over steer, over accelerate, or over brake. If you do, your vehicle may skid. On tank trailers, if your drive wheels or trailer wheels begin to skid, your vehicle may jackknife. When any vehicle starts to skid, you must take action to restore traction to the wheels.

may see on road signs, or to HM in government regulations. Hazardous materials include explosives, various types of gas, solids, flammable and combustible liquid, and other materials. Because of the risks involved and the potential consequences these risks impose, all levels of government regulate the handling of hazardous materials.

The Hazardous Materials Regulations (HMR) is found in parts 171-180 of title 49 of the Code of Federal Regulations. The common reference for these regulations is 49 CFR 171-180.

The Hazardous Materials Table in these regulations contains a list of these items. However, this list is not all-inclusive. Whether or not a material is considered hazardous is based on its characteristics and the shipper's decision on whether or not the material meets a definition of a hazardous material in the regulations.

The regulations require vehicles transporting certain types or quantities of hazardous materials to display diamond-shaped, square on point, warning signs called placards.

This section is designed to assist you in understanding your role and responsibilities in hauling hazardous materials. Due to the constantly changing nature of government regulations, it is impossible to guarantee absolute accuracy of the materials in this section. An up-to-date copy of the complete regulations is essential for you to have. Included in these regulations is a complete glossary of terms.

You must have a commercial driver license (CDL) with a hazardous materials endorsement before you drive any size vehicle that is used in the transportation of any material that requires hazardous material placarding or any quantity of a material listed as a select agent or toxin in 42 CFR 93. You must pass a written test about the regulations and requirements to get this endorsement.

Everything you need to know to pass the written test is in this section. However, this is only a beginning. Most drivers need to know much more on the job. You can learn more by reading and understanding the federal and state rules applicable to hazardous materials, as well as, attending hazardous materials training courses. Your employer, colleges and universities, and various associations usually offer these courses. You can get copies of the Federal Regulations (49 CFR) through your local Government Printing Office bookstore and various industry publishers. Union or company offices often

Section 8 Test Your Knowledge

1. How are bulkheads different than baffles?
2. Should a tank vehicle take curves, on ramps, or off ramps at the posted speed limits?
3. How are smooth bore tankers different to drive than those with baffles?
4. What three things determine how much liquid you can load?
5. What is outage?
6. How can you help control surge?
7. What two reasons make special care necessary when driving tank vehicles?

These questions may be on the test. If you can't answer them all, re-read Section 8.

Section 9 HAZARDOUS MATERIALS

This Section Covers

- **The Intent of the Regulations**
- **Bulk Tank Loading, Unloading, and Marking**
- **Driver Responsibilities**
- **Driving and Parking Rules**
- **Communications Rules**
- **Emergencies**
- **Loading and Unloading**

Hazardous materials are products that pose a risk to health, safety, and property during transportation. The term often is shortened to HAZMAT, which you