

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 your vehicle has a permanently mounted cargo tank of any capacity or if your vehicle is carrying a portable tank with a capacity of 1,000 gallons or more.

Drivers who need the hazardous materials endorsement must learn the placard rules. If you do not know if your vehicle needs placards, ask your employer. Never drive a vehicle needing placards unless you have the hazardous materials endorsement. To do so is a crime. When stopped, you will be cited and you will not be allowed to drive your truck farther. It will cost you time and money. A failure to placard when needed may risk your life and others if you have an accident. Emergency help will not know of your hazardous cargo.

Hazardous materials drivers must also know which products they can load together and which they cannot. These rules are also in Section 9. Before loading a truck with more than one type of product, you must know if it is safe to load them together. If you do not know, ask your employer and consult the regulations.

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### Subsections 2.22, 2.23, and 2.24 Test Your Knowledge

1. Common medicines for colds can make you sleepy. True or False?
2. What should you do if you become sleepy while driving?
3. Coffee and a little fresh air will help a drinker sober up. True or False?
4. What is a hazardous materials placard?
5. Why are placards used?
6. What is "sleep debt"?
7. What are the danger signals of drowsy driving?

These questions may be on the test. If you can't answer them all, reread subsections 2.22, 2.23, and 2.24.

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## Section 3 TRANSPORTING CARGO SAFELY

### This Section Covers

- **Inspecting Cargo**
- **Cargo Weight and Balance**
- **Securing Cargo**
- **Cargo Needing Special Attention**

This section tells you about hauling cargo safely. You must understand basic cargo safety rules to get a CDL.

If you load cargo wrong or do not secure it, it can be a danger to others and yourself. Loose cargo that falls off a vehicle can cause traffic problems and others could be hurt or killed. Loose cargo could hurt or kill you during a quick stop or crash. Your vehicle could be damaged by an overload. Steering could be affected by how a vehicle is loaded, making it more difficult to control the vehicle.

Whether or not you load and secure the cargo yourself, you are responsible for:

- Inspecting your cargo.
- Recognizing overloads and poorly balanced weight.
- Knowing your cargo is properly secured and does not obscure your view ahead or to the sides.
- Knowing your cargo does not restrict your access to emergency equipment.

If you intend to carry hazardous material that requires placards on your vehicle, you will also need to have a hazardous materials endorsement. Section 9 of this manual has the information you need to pass the hazardous materials test.

### 3.1 – Inspecting Cargo

As part of your pre-trip inspection, make sure the truck is not overloaded and the cargo is balanced and secured properly.

**After Starting.** Inspect the cargo and its securing devices again within the first 50 miles after beginning a trip. Make any adjustments needed.

**Re-check.** Re-check the cargo and securing devices as often as necessary during a trip to keep the load secure. You need to inspect again:

After you have driven for 3 hours or 150 miles.  
After every break you take during driving.

Federal, state, and local regulations for commercial vehicle weight, securing cargo, covering loads, and where you can drive large vehicles vary from place to place. Know the rules where you will be driving.

## 3.2 – Weight and Balance

You are responsible for not being overloaded. The following are some definitions of weight you should know.

### 3.2.1 – Definitions You Should Know

**Gross Vehicle Weight (GVW).** The total weight of a single vehicle plus its load.

**Gross Combination Weight (GCW).** The total weight of a powered unit, plus trailer(s), plus the cargo.

**Gross Vehicle Weight Rating (GVWR).** The maximum GVW specified by the manufacturer for a single vehicle plus its load.

**Gross Combination Weight Rating (GCWR).** The maximum GCW specified by the manufacturer for a specific combination of vehicles plus its load.

**Axle Weight.** The weight transmitted to the ground by one axle or one set of axles.

**Tire Load.** The maximum safe weight a tire can carry at a specified pressure. This rating is stated on the side of each tire.

**Suspension Systems.** Suspension systems have a manufacturer’s weight capacity rating.

**Coupling Device Capacity.** Coupling devices are rated for the maximum weight they can pull and/or carry.

### 3.2.2 – Legal Weight Limits

You must keep weights within legal limits. States have maximums for GVWs, GCWs, and axle weights. Often, maximum axle weights are set by a bridge formula. A bridge formula permits less maximum axle weight for axles that are closer together. This is to prevent overloading bridges and roadways.

Overloading can have bad effects on steering, braking, and speed control. Overloaded trucks have to go very slowly on upgrades. Worse, they may gain too much speed on downgrades. Stopping distance increases. Brakes can fail when forced to work too hard.

During bad weather or in mountains, it may not be safe to operate at legal maximum weights. Take this into account before driving.

### 3.2.3 – Don’t Be Top-heavy

The height of the vehicle’s center of gravity is very important for safe handling. A high center of gravity (cargo piled up high or heavy cargo on top) means you are more likely to tip over. It is most dangerous in curves, or if you have to swerve to avoid a hazard. It is very important to distribute the cargo so it is as low as possible. Put the heaviest parts of the cargo under the lightest parts.

### 3.2.4 – Balance the Weight

Poor weight balance can make vehicle handling unsafe. Too much weight on the steering axle can cause hard steering. It can damage the steering axle and tires. Under-loaded front axles (caused by shifting weight too far to the rear) can make the steering axle weight too light to steer safely. Too little weight on the driving axles can cause poor traction. The drive wheels may spin easily. During bad weather, the truck may not be able to keep going. Weight that is loaded so there is a high center of gravity causes greater chance of rollover. On flat bed vehicles, there is also a greater chance that the load will shift to the side or fall off. See Figure 3.1.

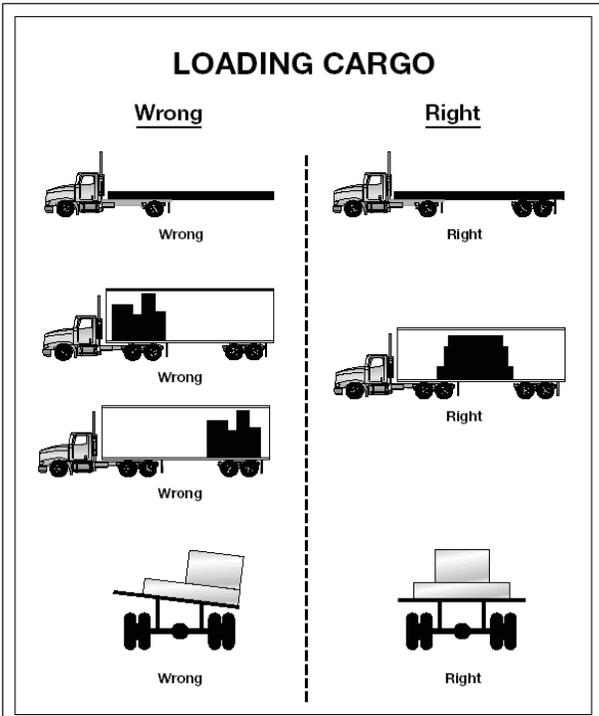
## 3.3 – Securing Cargo

### 3.3.1 – Blocking and Bracing

Blocking is used in the front, back, and/or sides of a piece of cargo to keep it from sliding. Blocking is shaped to fit snugly against cargo. It is secured to the cargo deck to prevent cargo movement. Bracing is also used to prevent movement of cargo. Bracing goes from the upper part of the cargo to the floor and/or walls of the cargo compartment.

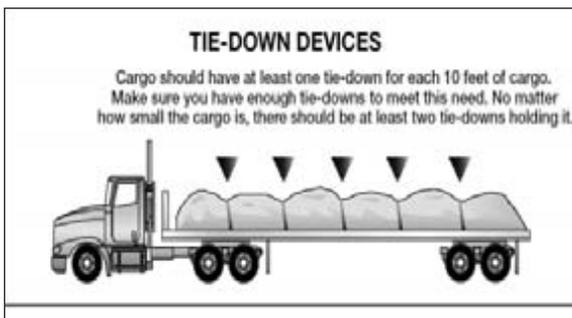
### 3.3.2 – Cargo Tiedown

On flatbed trailers or trailers without sides, cargo must be secured to keep it from shifting or falling off. In closed vans, tiedowns can also be important to prevent cargo shifting that may affect the handling of the vehicle. Tiedowns must be of the proper type



**Figure 3.1**

and proper strength. Federal regulations require the aggregate working load limit of any securement system used to secure an article or group of articles against movement must be at least one-half times the weight of the article or group of articles. Proper tiedown equipment must be used, including ropes, straps, chains, and tensioning devices (winches, ratchets, clinching components). Tiedowns must be attached to the vehicle correctly (hooks, bolts, rails, rings). See Figure 3.2.



**Figure 3.2**

Cargo should have at least one tiedown for each ten feet of cargo. Make sure you have enough tiedowns to meet this need. No matter how small the cargo, it should have at least two tiedowns.

There are special requirements for securing various heavy pieces of metal. Find out what they are if you are to carry such loads.

### 3.3.3 – Header Boards

Front-end header boards (“headache racks”) protect you from your cargo in case of a crash or emergency stop. Make sure the front-end structure is in good condition. The front-end structure should block the forward movement of any cargo you carry.

### 3.3.4 – Covering Cargo

There are two basic reasons for covering cargo:

- To protect people from spilled cargo.
- To protect the cargo from weather.

Spill protection is a safety requirement in many states. Be familiar with the laws in the states you drive in.

You should look at your cargo covers in the mirrors from time to time while driving. A flapping cover can tear loose, uncovering the cargo, and possibly block your view or someone else’s.

### 3.3.5 – Sealed and Containerized Loads

Containerized loads generally are used when freight is carried partway by rail or ship. Delivery by truck occurs at the beginning and/or end of the journey. Some containers have their own tiedown devices or locks that attach directly to a special frame. Others have to be loaded onto flatbed trailers. They must be properly secured just like any other cargo.

You cannot inspect sealed loads, but you should check that you don’t exceed gross weight and axle weight limits.

## 3.4 – Cargo Needing Special Attention

### 3.4.1 – Dry Bulk

Dry bulk tanks require special care because they have a high center of gravity and the load can shift. Be extremely cautious (slow and careful) going around curves and making sharp turns.

### 3.4.2 – Hanging Meat

Hanging meat (suspended beef, pork, lamb) in a refrigerated truck can be a very unstable load with a high center of gravity. Particular caution is needed on sharp curves such as off ramps and on ramps. Go slowly.

### 3.4.3 – Livestock

Livestock can move around in a trailer, causing unsafe handling. With less than a full load, use false bulkheads to keep livestock bunched together. Even when bunched, special care is necessary because livestock can lean on curves. This shifts the center of gravity and makes rollover more likely.

### 3.4.4 – Oversized Loads

Over-length, over-width, and/or overweight loads require special transit permits. Driving is usually limited to certain times. Special equipment may be necessary such as “wide load” signs, flashing lights, flags, etc. Such loads may require a police escort or pilot vehicles bearing warning signs and/or flashing lights. These special loads require special driving care.

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## Section 3 Test Your Knowledge

1. What four things related to cargo are drivers responsible for?
2. How often must you stop while on the road to check your cargo?
3. How is Gross Combination Weight Rating different from Gross Combination Weight?
4. Name two situations where legal maximum weights may not be safe.
5. What can happen if you don't have enough weight on the front axle?
6. What is the minimum number of tiedowns for any flatbed load?
7. What is the minimum number of tiedowns for a 20-foot load?
8. Name the two basic reasons for covering cargo on an open bed.
9. What must you check before transporting a sealed load?

These questions may be on your test. If you can't answer them all, reread Section 3.

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# Section 4 TRANSPORTING PASSENGERS SAFELY

## This Section Covers

- Vehicle Inspection
- Loading
- On the Road
- After-trip Vehicle Inspection
- Prohibited Practices
- Use of Brake-door Interlocks

Bus drivers must have a commercial driver license if they drive a vehicle designed to seat more than 16 or more persons, including the driver.

Bus drivers must have a passenger endorsement on their commercial driver license. To get the endorsement, you must pass a knowledge test on Sections 2 and 4 of this manual. (If your bus has air brakes, you must also pass a knowledge test on Section 5.) You must also pass the skills tests required for the class of vehicle you drive.

## 4.1 – Vehicle Inspection

Before driving your bus, you must be sure it is safe. You must review the inspection report made by the previous driver. Only if defects reported earlier have been certified as repaired or not needed to be repaired, should you sign the previous driver's report. This is your certification that the defects reported earlier have been fixed.

### 4.1.1 – Vehicle Systems

Make sure these things are in good working order before driving:

- Service brakes, including air hose couplings (if your bus has a trailer or semitrailer).
- Parking brake.
- Steering mechanism.
- Lights and reflectors.
- Tires (front wheels must not have recapped or regrooved tires).
- Horn.
- Windshield wiper or wipers.
- Rear-vision mirror or mirrors.
- Coupling devices (if present).
- Wheels and rims.
- Emergency equipment.