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WYOMING SPECIFIC CDL INFORMATION

This Section Covers
- CDL Licensing Requirements
- Getting your CDL License

CDL Licensing Requirements

Requirements to Drive
To drive any type of vehicle legally in Wyoming, you must have a valid driver license, instruction permit, intermediate license or restricted license. Wyoming licenses are issued by the Driver Services Program of the Wyoming Department of Transportation (WYDOT).

Who Does Not Need a Wyoming License?
- Employees of the United States government operating vehicles owned or leased by the U.S. government;
- Members of the Armed Forces stationed in Wyoming, and their dependents, who have a valid license issued by their state of residence;
- Full-time students attending the University of Wyoming or a Wyoming junior college and who have a valid license from another state; and
- Any person licensed by another state which is a Driver License Compact member (see page i.xi), unless the person chooses to have a Wyoming driver license. Such an out-of-state license must be surrendered within one year of residency in Wyoming.

Who Cannot Get a Wyoming CDL or Heavy Vehicle Driver License?
- Persons under 18 years of age;
- Persons whose driving privileges are suspended, canceled, denied or revoked in this or any other state. The Problem Driver Pointer System and other electronic systems will be checked on all applicants to verify that their privilege to drive is not withdrawn in this or any other state;
- Persons who fail any portion of the required driver license examination(s);
- Persons who have been judged legally incompetent;
- Persons who are habitual users of alcohol or any controlled substance;
- Persons who are in violation of the Immigration Laws of the United States. Some non-citizens of the U.S. may qualify for a license to drive. Immigration documents are required to determine whether or not a legal alien may be licensed. Contact your local examiner for details.

Drivers of the Following Types of Vehicles Must Have a CDL:
- Those weighing 26,001 or more pounds Gross Combination Weight Rating (GCWR), or
- Those designed to carry 16 or more passengers (including the driver), or
- Those transporting hazardous materials in quantities requiring placards (regardless of vehicle size.)

Operators of the following types of vehicles are exempt from CDL requirements, but must have either a Wyoming heavy vehicle license or an applicable Department of Defence license:
- Farm and ranch vehicles weighing 26,001 or more pounds Gross Combination Weight Rating controlled and operated by a farmer or rancher and used in agricultural operations within a 150 air-mile radius of domicile; or
- Fire fighting and related emergency equipment weighing 26,001 or more pounds Gross Combination Weight Rating; or
- Military equipment when owned or operated by the U.S. Department of Defense and operated by non-civilian personnel (including National Guard personnel while on active duty); or
- Recreational vehicles weighing 26,001 or more pounds Gross Combination Weight Rating used solely as a personal conveyance for recreational and leisure-time pursuits.

CDL License Classes

Class A - Combination Vehicles
A Class A license authorizes the holder to operate any vehicle or combination of vehicles with a gross combination weight rating (GCWR) of 26,001 pounds or more, providing the gross vehicle weight rating (GVWR) of the vehicle or vehicles being towed is in excess of 10,000 pounds.

Class B - Straight Trucks and Light Combinations
This license authorizes the holder to operate any single vehicle with a gross vehicle weight rating (GVWR) of 26,001 or more pounds or any such vehicle towing a vehicle...
Hand controls and/or other adaptive devices. Special equipment may include special brakes, a motor vehicle specially equipped with certain mechanical aids, or a motor vehicle equipped with both left and right outside rear view mirrors.

G) Restrictions restrict driving to daylight hours. No driving after sunset is permitted.

I) Restrictions allow for restrictions not covered by other specific restriction codes. It may involve a restriction, for instance, on mileage, speed, or alcohol or drug use following a doctor's medical regimen.

J) Restrictions make a Wyoming driver license issued without a photo valid.

K) Restrictions limit a commercial driver to operate a commercial vehicle intrastate only (within the borders of Wyoming). Examples: commercial drivers under 21 years of age or commercial drivers who have a disqualifying medical or visual condition.

L) Restrictions allow operation of a vehicle without air brakes by a person who does not take or pass the air brake written test or who passes the skills test in a vehicle that does not have air brakes.

M) Restrictions allow the operation of Class B buses for Class A license holders with “P” endorsements who either "grandfathered" or skills tested for Class “B” buses.

N) Restrictions allow the operation of Class C buses for Class A or B license holders with "P" endorsements who either "grandfathered" or skills tested for Class "C" buses.

O) Restrictions disallow the operation of tractor-trailer combinations by those who pass skills tests in Class “A” vehicles in which the pulling units only have a GVWR of 26,000 lbs. or less.

R) Restrictions mean the license holder may ONLY operate a "motorcycle" vehicle equipped with four wheels and only for recreation.

V) Variance means, have variance letter or SPE certificate in possession. CDL only.

Y) Restrictions mean the license holder must submit to a Driver Vision Evaluation form, completed by an eye specialist, every year.

Z) restrictions mean the license holder must submit a Driver Medical Evaluation form, completed by a physician or medical specialist, every year.

Acceptable Legal Identification

First-time applicants must provide a state certified birth certificate and a state issued photo identification card or state driver license. A valid U.S. passport or immigration documents with photo and signature are acceptable in lieu of a birth certificate. They must also be able to verify their Social Security number. Applicants for a commercial driver license must present a Social Security card, W-2 form, or financial/banking statement to verify their Social Security number.

For a Duplicate (Replacement) License, a state certified birth certificate (not a hospital record) or Wyoming state identification card are the preferred forms of identification. Two other forms of legal identification are also acceptable, including military discharge papers, baptismal certificates, car registration, photo student IDs, marriage certificates, passport, Social Security cards, mortgage papers, W-2 forms or court orders.

When licensees change their addresses, they must notify the department or a vehicle with an out-of-state CDL license. Clients with Wyoming CDLs will be required to keep their DMV records up to date as required by the State of Nebraska.

Required Tests

To obtain a CDL, applicants are required to complete a series of written knowledge tests, a vision screening, and a skills test. (Refer to License Services section for what test(s) are required.)

Written Tests: All written tests are multiple choice. The passing score for a written test is 80 percent. Applicants who fail one version of a written test may take another version of the test again the same day; however, each version of the test cannot be taken more than once in the same day. The applicant is only required to retake the test they failed. Written tests that are passed are valid for two years.

Physical Required

A Federal Motor Carrier Safety Administration physical is required when applying for a CDL unless exempted by FMCSA Part 391. For additional information, call the Federal Motor Carrier Safety Administration's Wyoming office at (307) 772-2305. (Note: Any applicant for a CDL or CDL who has a disqualifying medical or visual condition or whose visual acuity is worse than 20/40 in one eye, will be restricted to Intrastate driving only, unless presenting a DOT medical waiver card for that condition.)

Clients with Wyoming CDL's will be required to take the 50 question general knowledge test and any other applicable tests because Nebraska does not require their commercial permit holders to take any written tests.

An applicant possesses a commercial permit issued by the State of Nebraska will be required to take the 50 question general knowledge test and any other applicable tests because Nebraska does not require their commercial permit holders to take any written tests.

An applicant possesses a CDL license with a physical endorsement “F” will be required to take the hazardous materials test upon transferring their out-of-state CDL license. Clients with Wyoming CDLs will be required to retake the hazmat test if "test score tracking" does not indicate that test has been passed within the previous two years.

An applicant possesses an out-of-state CDL license with a school bus endorsement (“S”) issued prior to Sep-
Release must be signed by a legal parent or legal guardian. The applicant's driving record will be checked through the Problem Driver Pointer System and other electronic systems for any adverse actions. The skills test (if required) will be given in a vehicle of the same class and type as the class of license being applied for.

Renewal: Issued to all applicants who hold a valid Wyoming license. Licensees over 21 years of age may renew within 120 days of expiration. Licensees under 21 years of age may renew within 90 days of expiration. All CDL licensees with the Hazardous Materials endorsement ("H" or "X") are required to appear in person to renew their Wyoming CDL licenses and present their TSA background check paperwork. Applicants must pass a vision screening. A skills test may be required any time at the discretion of the examiner; however, a skills test will be required when a CDL license holder has been disqualified or has not held that same class of license for the past two years. A skills test will be taken in a vehicle of the same class and type as the class of license being renewed. Holders of a non-commercial class "A" or "B" may "grandfather" to a CDL license of the same class provided they have held that class of license for the past two years. They will be required to pass all applicable written exams.

Expired License: Persons who let their license expire must apply for a new license. These individuals should be prepared to go through all phases of the examination process, which includes the written test(s), vision screening, and skills test. Licensees who have been disqualified or have let their CDL license expire for two years or more, will be required to skills test in a vehicle of the same class and type as the class of license being applied for.

Out-of-State Applicants: CDL license holders are required to obtain a Wyoming CDL license within 30 days of becoming a resident of Wyoming.

Applicants who wish to add additional endorsements to their CDL license are required to pass the specific CDL knowledge and skills test. Licensees who have the Hazardous Materials endorsement on their out-of-state CDL will be required to take the CDL Hazardous Materials written test before issuance of a Wyoming commercial license and must present their TSA background check certification. Hazmat drivers failing to present a new background check will have their license expiration reduced down from four years to the expiration of their current TSA check.

Applicants applying for a Wyoming CDL who have not held a valid license within the past two years, are required to pass the Wyoming "Rules of the Road" test in addition to all applicable CDL knowledge test(s) for the class of CDL they are applying for. Upon successful completion of the written test(s), they will be required to pass a skills test in a vehicle of the same class and type as the class of license being applied for.

All drivers applying for a CDL must present a valid DOT Medical Certificate.
Section 1
INTRODUCTION

This Section Covers

- Commercial Driver License Tests
- Driver Disqualifications
- Other Safety Rules

There is a federal requirement that each state have minimum standards for the licensing of commercial drivers.

This manual provides driver license testing information for drivers who wish to have a commercial driver license (CDL). This manual does NOT provide information on all the federal and state requirements needed before you can drive a commercial motor vehicle (CMV). You may have to contact your state driver licensing authority for additional information.

You must have a CDL to operate:

- Any single vehicle with a gross vehicle weight rating (GVWR) of 26,001 pounds or more.
- A combination vehicle with a gross combination weight rating of 26,001 or more pounds, if the trailer(s) has a GVWR of 10,001 or more pounds.
- A vehicle designed to transport 16 or more passengers (including the driver).
- Any size vehicle which requires hazardous material placards or is carrying material listed as a select agent or toxin in 42 CFR part 73. Federal regulations through the Department of Homeland Security require a background check and fingerprinting for the Hazardous Materials endorsement. Contact your local department of driver licensing for more information.

(Your state may have additional definitions of CMVs.)

To get a CDL, you must pass knowledge and skills tests. This manual will help you pass the tests. This manual is not a substitute for a truck driver training class or program. Formal training is the most reliable way to learn the many special skills required for safely driving a large commercial vehicle and becoming a professional driver in the trucking industry.

Figure 1.1 helps you determine if you need a CDL.

Do You Need a CDL?

- Does the vehicle or combination of vehicles have a manufacturer’s weight rating (GVWR) over 26,000 pounds?
  - No
  - Yes
    - Is the vehicle a combination vehicle towing a unit over 10,000 pounds GVWR?
      - No
      - Yes
        - You need a Class A CDL.
        - You need a Class B CDL.
    - No
      - Is the vehicle designed to carry 16 or more people (including the driver)?
        - No
        - Yes
          - You need a Class C CDL.
          - You DO NOT need a CDL.
      - Yes
        - Does the vehicle require hazardous material placards or transport a select agent or toxin?
          - No
          - Yes
            - You need a Class C CDL.
            - You need a Class B CDL.

NOTE: A bus may be Class A, B, or C depending on whether the GVWR is over 26,001 pounds or is a combination vehicle.

Figure 1.1
1.1 – Commercial Driver License Tests

1.1.1 – Knowledge Tests
You will have to take one or more knowledge tests, depending on what class of license and what endorsements you need. The CDL knowledge tests include:
- The general knowledge test, taken by all applicants;
- The passenger transport test, taken by all bus driver applicants;
- The air brakes test, which you must take if your vehicle has air brakes, including air over hydraulic brakes;
- The combination vehicles test, which is required if you want to drive combination vehicles;
- The hazardous materials test, required if you want to haul hazardous materials as defined in 49 CFR 383.3.
In order to obtain this endorsement you are also required to pass a Transportation Security Administration (TSA) background check;
- The tanker test, required if 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;
- The doubles/triples test, required if you want to pull double or triple trailers;
- The school bus test, required if you want to drive a school bus.

1.1.2 – Skills Tests
If you pass the required knowledge test(s), you can take the CDL skills tests. There are three types of general skills that will be tested: pre-trip inspection, basic vehicle control, and on-road driving. You must take these tests in the type of vehicle for which you wish to be licensed. Any vehicle that has components marked or labeled cannot be used for the Pre-Trip Inspection Test.

Pre-trip Vehicle Inspection. You will be tested to see if you know whether your vehicle is safe to drive. You will be asked to do a pre-trip inspection of your vehicle and explain to the examiner what you would inspect and why.

Basic Vehicle Control. You will be tested on your skill to control the vehicle. You will be asked to move your vehicle forward, backward, and turn within a defined area. These areas may be marked with traffic lanes, cones, barriers, or something similar. The examiner will tell you how each control test is to be done.

On-road Test. You will be tested on your skill to safely drive your vehicle in a variety of traffic situations. The situations may include left and right turns, intersections, railroad crossings, curves, up and down grades, single or multi-lane roads, streets, or highways. The examiner will tell you where to drive.

Figure 1.2 details which sections of this manual you should study for each particular class of license and for each endorsement.

1.1.3 – Endorsements
You will have to take one or more knowledge tests, depending on what class of license and what endorsements you need. The CDL knowledge tests include:
- Driving a CMV under the influence of alcohol;
- Refusing to undergo blood alcohol testing;
- Driving a CMV while under the influence of a controlled substance;
- Leaving the scene of an accident involving a CMV;
- Committing a felony involving the use of a CMV;
- Driving a CMV when the CDL is suspended;
- Causing a fatality through negligent operation of a CMV.
You will lose your CDL for at least three years if the offense occurs while you are operating a CMV that is placarded for hazardous materials.
You will lose your CDL for life for a second offense.
You will lose your CDL for life if you use a CMV to commit a felony involving controlled substances.
You will be put out-of-service for 24 hours if you have any detectable amount of alcohol under 0.04 percent.

1.2.3 – Serious Traffic Violations
Serious traffic violations are excessive speeding (15 mph or more above the posted limit), reckless driving, improper or erratic lane changes, following a vehicle too closely, traffic offenses committed in a CMV in connection with fatal traffic accidents, driving a CMV without obtaining a CDL or having a CDL in the driver’s possession, and driving a CMV without the proper class of CDL and/or endorsements.
You will lose your CDL:
- For at least 60 days if you have committed two serious traffic violations within a three-year period involving a CMV.
- For at least 120 days for three or more serious traffic violations within a three-year period involving a CMV.

1.2.4 – Violation of Out-of-Service Orders
You will lose your CDL:
- For at least 90 days if you have committed your first violation of an out-of-service order.
- For at least one year if you have committed two violations of an out-of-service order in a ten-year period.
- For at least three years if you have committed three or more violations of an out-of-service order in a ten-year period.

1.2.5 – Railroad-highway Grade Crossing Violations
You will lose your CDL:
- For at least 60 days for your first violation;
- For at least 120 days for your second violation within a three-year period;
- For at least one year for your third violation within a three-year period.

These violations include violation of a federal, state or local law or regulation pertaining to one of the following six offenses at a railroad-highway grade crossing:
- For drivers who are not required to always stop, failing to stop before reaching the crossing, if the tracks are not clear;
- For drivers who are not required to always stop, failing to slow down and check that the tracks are clear of an approaching train;
- For drivers who are always required to stop, failing to stop before driving onto the crossing;
- For all drivers, failing to have sufficient space to drive completely through the crossing without stopping;
- For all drivers failing to obey a traffic control device or the directions of an official at the crossing;
- For all drivers failing to negotiate a crossing because of insufficient undercrossing clearance.

1.2.6 – Hazardous Materials Endorsement Background Check and Disqualifications
If you require a hazardous materials endorsement you will be required to submit your fingerprints and be subject to a background check.
You will be denied or you will lose your hazardous materials endorsement if you:
- Are not a lawful permanent resident of the United States;
- Renounce your United States citizenship;
- Are wanted or under indictment for certain felonies;
- Have a conviction in military or civilian court for certain felonies;
- Have been adjudicated as a mental defective or committed to a mental institution; or
- Are considered to pose a security threat as determined by the Transportation Security Administration.

The背景 check procedures vary from jurisdiction to jurisdiction. Your licensing agency will provide you with all the information you need to complete the required TSA background check procedures.

1.2.7 – Traffic Violations in your Personal Vehicle
The Motor Carrier Safety Improvement Act (MCSIA) of 1999 requires a CDL holder to be disqualified from operating a commercial motor vehicle if the CDL holder has been convicted of certain types of moving violations in their personal vehicle:
- If you have been convicted of a driving under the influence of alcohol, you will lose your CDL;
- If you have been convicted of a second driving under the influence of alcohol, you will lose your CDL for one year.

If you have been convicted of a certain types of moving violations in your personal vehicle:
- If your privilege to operate your personal vehicle is revoked, cancelled, or suspended due to traffic violations, you will lose your CDL driving privileges.
- If you have been convicted of a certain types of moving violations in your personal vehicle:
- If your privilege to operate your personal vehicle is revoked, cancelled, or suspended due to alcohol, controlled substance or felony violations, you will lose your CDL for one year.

If your license to operate your personal vehicle is revoked, cancelled, or suspended, you may not obtain a "hardship" license to operate a CMV.
Your state may have additional rules that you must also obey.

You must notify your employer within 30 days of conviction for any traffic violations (except parking). This is true no matter what type of vehicle you were driving.

You must notify your motor vehicle licensing agency within 30 days if you are convicted in any other jurisdiction of any traffic violation (except parking). This is true no matter what type of vehicle you were driving.

You must notify your employer within two business days if your license is suspended, revoked, or canceled, or if you are disqualified from driving.

You must give your employer or other information on all driving jobs you have held for the past 10 years. You must do this when you renew a commercial driving job.

No one can drive a commercial motor vehicle without a CDL. A court may fine you up to $5,000 or put you in jail for breaking this rule.

If you have a hazardous materials endorsement you must notify your employer and surrender your hazardous materials endorsement to the state that issued your CDL within 24 hours of any conviction or indictment in any jurisdiction, civil or military, for, or found not guilty by reason of insanity of a disqualifying crime listed in 49 CFR 1572.103; who is adjudicated as a mental defective or committed to a mental institution as specified in 49 CFR 1572.109; or who renounces his or her U.S. citizenship.

Your employer may not let you drive a commercial motor vehicle if you have more than one license or if you're CDL is suspended or revoked. A court may fine the employer up to $5,000 or put him/her in jail for breaking this rule.

All states are connected to one computerized system to share information about CDL drivers. The states will check on drivers’ accident records to be sure that drivers do not have more than one CDL.

A Qualified Vehicle is (except as provided below) any vehicle owner or the vehicle operator.

For more information, contact WYDOT’s Public Affairs Office at 3300 Bishop Blvd., Cheyenne, WY 82009-3340 or by calling (307) 777-4013.
Fuel:
Per Section P560 of the IFTA Procedures Manual

For additional information on IFTA and the requirements related to IFTA, contact the appropriate agency in your base jurisdiction. You will also find useful information about the Agreement at the official repository of IFTA at http://www.iftach.org/index.php.

An example of an IVDR that must be completed in its entirety for each trip can be found in Figure 1 (page 1.7). Each individual IVDR should be filled out for only one vehicle. The rules to follow when trying to determine how and when to log an odometer reading are the following:

- At the beginning of the day
- When leaving the state or province
- At the end of the trip/day

Not only do the trips need to be logged, but the fuel purchases need to be documented as well. You must obtain a receipt for all fueling and include it with your completed IVDR.

Make sure that any trips that you enter are always filled out in descending order and that your trips include all state/provinces that you traveled through on your route.

There are different routes that a driver may take, and most of the miles may be within one state or province. Whether or not the distance you travel is primarily in one jurisdiction or spread among several jurisdictions, all information for the trip must be recorded. This includes the dates, the routes, odometer readings and fuel purchases.

By completing this document in full and keeping all records required by both the IRP and the IFTA, you will have ensured that you and your company are in compliance with all State and Provincial laws surrounding fuel and distance record keeping requirements.

The IVDR serves as the source document for the calculation of fees and taxes that are payable to the jurisdictions in which the vehicle is operated, so these original records must be maintained for a minimum of four years. In addition, these records are subject to audit by the taxing jurisdictions. Failure to maintain complete and accurate records could result in fines, penalties and suspension or revocation of IRP registrations and IFTA licenses.

For additional information on the IRP and the requirements related to the IRP, contact your base jurisdiction motor vehicle department or IRP, Inc. the official repository for the IRP. Additional information can be found on the IRP, Inc. website at www.triponline.org.
2.1 – Vehicle Inspection

2.1.1 – Why Inspect

Safety is the most important reason you inspect your vehicle, safety for yourself and for other road users.

A vehicle defect found during an inspection could save you problems later. You could have a breakdown on the road that will cost time and dollars, or even worse, a crash caused by the defect.

Federal and state laws require that drivers inspect their vehicles. Federal and state inspectors also may inspect your vehicles. If they judge the vehicle to be unsafe, they will put it "out of service" until it is fixed.

2.1.2 – Types of Vehicle Inspection

Pre-Trip Inspection. A pre-trip inspection will help you find problems that could cause a crash or breakdown.

During a Trip. For safety you should:

- Watch gauges for signs of trouble;
- Use your senses to check for problems (look, listen, smell, feel);
- Check critical items when you stop:
  - Tires, wheels and rims;
  - Brakes;
  - Lights and reflectors;
  - Brake and electrical connections to trailer;
  - Trailer coupling devices; and
  - Cargo securement devices.

After-trip Inspection and Report. You should do an after-trip inspection at the end of the trip, day, or tour of duty on each vehicle you operated. It may include filling out a vehicle condition report listing any problems you find. The inspection report helps a motor carrier know when the vehicle needs repairs.

2.1.3 – What to Look For

Tire Problems

- Too much or too little air pressure;
- Bad wear. You need at least 4/32-inch tread depth in every major groove on front tires. You need 2/32 inch on other tires. No fabric should show through the tread or sidewall;
- Cuts or other damage;
- Tread separation;
- Dual tires that come in contact with each other or parts of the vehicle;
- Mismatched sizes;
- Radial and bias-ply tires used together;
- Cuts or cracked valve stems; and
- Regrooved, recapped, or retreaded tires on the front wheels of a bus. These are prohibited.

A driver must examine each tire at the beginning of each trip and each time the vehicle is parked.

Wheel and Rim Problems

- Damaged rims;
- Rust around wheel nuts may mean the nuts are loose; check tightness. After a tire has been changed, stop a short while later and re-check tightness of nuts,
Bad Brake Drums or Shoes
- Cracked drums;
- Shoes or pads with oil, grease, or brake fluid on them;
- Shoes worn dangerously thin, missing, or broken.

Steering System Defects
- Missing nuts, bolts, cotter keys, or other parts;
- Bent, loose, or broken parts, such as steering column, steering gear box, or tie rod;
- If power steering equipped, check hoses, pumps, and fluid level, check for leaks;
- Steering wheel play of more than 10 degrees (approximate two inches movement at the rim of a 20-inch steering wheel) can make it hard to steer.

Suspension System Defects
- Any loose, cracked, broken, or missing frame members.
- Torque rod or arm, u-bolts, spring hangers, or other parts.
- Leaking shock absorbers;
- Cracked or broken spring hangers;
- Spring hangers that allow movement of axle from proper position.
- Axle positioning parts that are cracked, damaged, or shifted so they might hit a tire or other part;
- Mismatched, bent, or cracked lock rings are dangerous;
- Mismatched, bent, or cracked lock rings are dangerous;
- Auxiliary spring parts that are leaking.

Emergency Equipment
- Vehicles must be equipped with emergency equipment. Look for:
  - Fire extinguisher(s);
  - Spare electrical fuses (unless equipped with circuit breakers); and
  - Warning devices for parked vehicles (for example, three reflective warning triangles or 3 liquid burning flares).

Cargo (Trucks)
- You must make sure the truck is not overloaded and the cargo is balanced and secured before each trip. If the cargo contains hazardous materials, you must inspect for proper papers and placarding.

Exhaust System Defects
- A broken exhaust system can let poisonous fumes into the cab or sleeper berth. Look for:
  - Loose, broken, or missing exhaust pipes, mufflers, tailpipes, or vertical stacks;
  - Loose, broken, or missing mounting brackets, clamps, bolts, or nuts;
  - Exhaust system parts rubbing against fuel system parts, tires, or other moving parts of vehicle; and
  - Exhaust system parts that are leaking.

Engine Oil Fluid level
- Coolant level in radiator; condition of hoses;
- Power steering fluid level, hose condition (if so equipped);
- Windshield washer fluid level;
- Battery fluid level, connections, and tie downs (battery may be located elsewhere);
- Automatic transmission fluid level (may require engine to be running);
- Check belts for tightness and excessive wear (alternator, water pump, air compressor); learn how much “give” the belts should have when adjusted right, and check each one;
- Leaks in the engine compartment (fuel, coolant, oil, power steering fluid, hydraulic fluid, battery fluid); and
- Cracked, worn electrical wiring insulation.

Lower and secure hood, cab, or engine compartment door.

Step 3: Start Engine and Inspect Inside the Cab
Get In and Start Engine
- Make sure parking brake is on;
- Put gearshift in neutral (or “park” if automatic);
- Start engine; listen for unusual noises; and
- If equipped, check the Anti-lock Braking System (ABS) indicator lights. Light on dash should come on and then turn off. If it stays on the ABS is not working properly.

Look at the Gauges
- Oil pressure should come up to normal within seconds after engine is started (See Figure 2.5.);
- Air pressure should build from 50 to 90 psi within three minutes. (Build air pressure to governor cut-out usually around 120 – 140 psi. Know your vehicles requirements);
- Ammeter and/or voltmeter should be in normal range(s);
- Coolant temperature should begin gradual rise to normal operating range;
- Engine oil temperature should begin gradual rise to normal operating range;
- Warning lights and buzzers for oil, coolant, charging circuit warning, and anti-lock brake system lights should go out right away.

Check Condition of Controls
- Check all of the following for looseness, sticking, damage, or improper setting:
  - Steering wheel,
  - Clutch,
  - Accelerator (“gas pedal”),
  - Brake controls
  - Foot brake;
  - Trailer brake (if vehicle has one);
  - Parking brake;
  - Retarder controls (if vehicle has them);
  - Transmission controls,
Step 5: Do Walk-Around Inspection

- Go to front of vehicle and check that low beams are on and both of the four-way flashers are working.
- Push dimmer switch and check that high beams work.
- Turn off headlights and four-way emergency flashers.
- Turn on parking, clearance, side-marker, and identification lights, and turn off right turn signal, and start walk-around inspection.

General

- Walk Around and inspect,
- Clean all lights, reflectors, and glass as you go along.
- Check for optional items such as:
  - Headlight cover:
  - Check for safety equipment:
    - Horn(s);
    - Turn off headlights and four-way emergency flashers;
    - Windshield wiper/washer;
    - Lights:
      - Headlights;
      - Dimmer switch;
      - Four-way flashers;
      - Side-view, clearance, identification, marker switch(es).

Left Front Side

- Driver's door glass should be clean,
- Door latches or locks should work properly,
- Left front wheel:
  - Condition of wheel and rim — missing, bent,
  - Brake drum or disc;
  - Condition of shock absorber(s);
  - Left front brake:
    - Condition of brake drum or disc; and
    - Condition of hoses.

Front

- Condition of front axle;
- Condition of steering system:
  - No loose, worn, bent, damaged or missing parts;
  - Must grab steering mechanism to test for looseness;
- Check windshield wiper blades for damage, “stiff,” rubber, and security mounts;
- Wiper blades:
  - Parking, clearance, and identification lights clean, operating, and proper color (amber at front);
  - Reflectors clean and proper color (amber at front);
  - Right front turn signal light clean, operating, and proper color (amber or white on signals facing forward).

Right Side

- Right front: check all items as done on left front;
- Right fuel tank:
  - Securely mounted, not damaged, or leaking;
  - Fuel crossover line secure;
  - Tank(s) contain enough fuel;
  - Caps(s) on and secure;
  - Condition of visible parts:
  - Rear of engine not leaking;
  - Transmission not leaking;
  - Exhaust system secure, not leaking, not touching wires, fuel, or air lines;
  - Frame and cross members, no bends or cracks;
  - Air lines and electrical wiring secured against rubbing, running, or rubbing,
  - Spare tire carrier or rack not damaged (if so equipped);
  - Spare tire and/or wheel securely mounted in rack;
  - Spare tire and wheel adequate (proper size, properly inflated);
  - Cargo security (trucks):
    - Cargo properly blocked, braced, tied, chained, etc.;
    - Header board adequate, secure (if required);
    - Side boards, stakes strong enough, free of damage, properly set in place (if so equipped);
    - Canvas or tarp (if required) securely mounted and all required permits are in driver’s possession;
    - Rear doors securely closed, latched/locked;

Right Rear

- Condition of wheels and rims, no missing, bent, or broken spacers, studs, or lugs;
- Condition of tires, properly inflated, valve stems and caps OK, no serious cuts, bulges, tread wear, no rubbing each other, and nothing stuck between them;
- tires same type, e.g., not mixed radial and bias types;
- Tires evenly matched (same sizes);
- Wheel bearing/seals not leaking;
- Suspension:
  - Condition of spring(s), spring hangers, shackles, u-bolts, and shock absorber;
  - Air pressure:
    - Idling: 5–20 PSI
    - Operating: 35–75 PSI
- Front brakes and wheel bearings:
  - Axle secure;
  - Powered axle(s) not leaking lube (gear oil);
  - Container of torque rod arms, bushings;
  - Use wrench to test rust-streaked lug nuts, indicating looseness;
  - Hub oil level OK, no leaks;
- Left front suspension:
  - Condition of spring, spring hangers, shackles, u-bolts, and shock absorber condition;

Check wiper blades for damage, “stiff,” rubber, and security mounts:
- Parking, clearance, and identification lights clean, operating, and proper color (amber at front);
- Reflectors clean and proper color (amber at front);
- Right front turn signal light clean, operating, and proper color (amber or white on signals facing forward).

Step 6: Check Signal Lights

- Get in and turn off lights;
- Take off all lights;
- Turn on stop lights (apply trailer hand brake or have a helper put on the brake pedal);
- Turn on left turn signal lights.

Get Out and Check Lights:

- Left front turn signal light clean, operating and proper color (amber or white on signals facing the front);
- Rear
  - Side-markers light clean operating, and proper color (red at rear, amber other amber);
  - Side-marker reflectors clean and proper color (red at rear, others amber);
  - Mirrors:
    - Mirrors:
      - Correctly adjusted;
      - Mirrors:
        - Properly set in place (if so equipped);
        - Header board adequate, secure (if required);
        - Side boards, stakes strong enough, free of damage, properly set in place (if so equipped);
        - Canvas or tarp (if required) securely mounted and all required permits are in driver’s possession;
        - Rear doors securely closed, latched/locked;

- Battery(ies) present, clean, and secured;
- Cargo properly blocked, braced, tied, chained, etc.;
- Tailboards up and properly secured;
- End gates free of damage, properly secured in stake sockets;
- Canvas or tarp (if required) properly secured to prevent tearing, billowing, or blocking of either the rearview mirrors or rear lights;
- If over-length, or over-width, make sure all signs and/or additional lights/flags are safely and properly mounted and all required permits are in driver’s possession;
- Rear doors securely closed, latched/locked.

Light Side

- Check all items as done on right side, plus:
  - Battery(ies) if not mounted in engine compartment;
  - Battery box(es) securely mounted to vehicle;
  - Box has secure cover;
  - Battery(ies) secured against movement;
  - Battery(ies) not broken or leaking;
- Fluid in battery(ies) at proper level (except maintenance-free type);

- Cell caps present and securely tightened (except maintenance-free type);
- Vents in cell caps free of foreign material (except maintenance-free type).

Figure 2.5

Check Mirrors and Windshield: Inspect mirrors and windshield for cracks, dirt, illegal stickers, or other obstructions to seeing clearly. Clean and adjust as necessary.

Check Emergency Equipment:

- Check for safety equipment:
  - Spare electrical fuses (unless vehicle has circuit breakers);
  - Three red reflective triangles, 6 fuses or 3 liquid burning flares;
- Properly charged and rated fire extinguisher;
- Check for optional items such as:
  - Chains (where winter conditions require);
  - Tire changing equipment;
  - Chains (where winter conditions require);
- Test for Hydraulic Leaks.
If the vehicle has hydraulic brakes, pump the brake pedal three times. Then apply firm pressure to the pedal and hold for five seconds. The pedal should not move. If it does, there may be a leak or other problem. Get it fixed before driving. If the vehicle has air brakes, do the checks described in Sections 5 and 6 of this manual.

Brake System
Test Parking Brake(s)
- Fasten safety belt
- Set parking brake (power unit only)
- Release trailer parking brake (if applicable)
- Place vehicle into a low gear
- Gently pull forward against parking brake to make sure the parking brake holds
- Repeat the same steps for the trailer with trailer parking brake set and power unit parking brakes released (if applicable)
- If it doesn’t hold vehicle, it is faulty; get it fixed

Test Service Brake Stopping Action
- Go about five miles per hour
- Push brake pedal firmly
- “Pulling” to one side or the other can mean brake trouble
- Any unusual brake pedal “feel” or delayed stopping action can mean trouble

A preliminary check during the walk-around inspection.

If you find anything unsafe during the pre-trip inspection, get it fixed. Federal and state laws forbid operating an unsafe vehicle.

2.1.6 – Inspection During a Trip
Check Vehicle Operation Regularly
You should check:
- Instruments
- Air pressure gauge (if you have air brakes)
- Temperature gauges
- Voltage gauges
- Ammeter/voltmeter
- Temperature gauges
- Mirrors
- Tires
- Cargo, cargo covers
- Lights
- Etc.
If you see, hear, smell, or feel anything that might mean trouble, check it out.

Safety Inspection. Drivers of trucks and truck tractors should be able to control their vehicle requires skill in:
- Accelerating
- Steering
- Stopping, and
- Backing safely.

Fasten your seat belt when on the road. Apply the parking brake when you leave your vehicle.

2.1 – Accelerating
Don’t roll back when you start. You may hit someone behind you. If you have a manual transmission vehicle, partly engage the clutch before you take your right foot off the brake. Put on the parking brake whenever necessary to keep from rolling back. Release the parking brake only when you have applied enough engine power to keep from rolling back. On a tractor-trailer equipped with a trailer hand brake valve, the hand valve can be applied to keep from rolling back.

Speed up smoothly and gradually so the vehicle does not jerk. Rough acceleration can cause mechanical damage. When pulling a trailer, rough acceleration can damage the coupling.

Speed up very gradually when traction is poor, or as rain or snow. If you use too much power, the drive wheels may spin. You could lose control. If the drive wheels begin to spin, take your foot off the accelerator.

2.2.3 – Stopping
Push the brake pedal down gradually. The amount of brake pressure you need to stop the vehicle will depend on the speed of the vehicle and how quickly you need to stop. Control the pressure so the vehicle comes to a smooth, safe stop. If you have a manual transmission, push the clutch in when the engine is close to idle.

2.2.4 – Backing Safely
Because you cannot see everything behind your vehicle, backing is always dangerous. Avoid backing whenever you can. When you park, try to park so you will be able to pull forward when you leave. When you have to back, here are a few simple safety rules:
- Start in the proper position
- Look at your path
- Use mirrors on both sides
- Back and
- Back and turn toward the driver’s side whenever possible
- Use a helper whenever possible

These rules are discussed in turn below.

Start in the Proper Position. Put the vehicle in the best position to allow you to back safely. This position will depend on the type of backing to be done.

Look at Your Path. Look at your line of travel before you begin. Get out and walk around the vehicle. Check your clearance to the sides and overhead, in and near the path your vehicle will take.

Use Mirrors on Both Sides. Check the outside mirrors on both sides frequently. Get out of the vehicle and check your path if you are unsure.

Back Slowly. Always back as slowly as possible. Use the lowest reverse gear. That way you can more easily correct any steering errors. You also can stop quickly if necessary.

2.2 – Basic Control of Your Vehicle
To drive a vehicle safely, you must be able to control its speed and direction. Safe operation of a commercial vehicle requires skill in:
- Accelerating
- Steering
- Stopping, and
- Backing safely.

Fasten your seat belt when on the road. Apply the parking brake when you leave your vehicle.

2.2.1 – Accelerating
To do this, you must learn to use engine sounds when to shift.

Knowing When to Shift Up. There are two ways of knowing when to shift:
- Use Engine Speed (rpm).
- Use Road Speed (mph).

Use Road Speed (mph). Learn what speeds each gear is good for. Then, by using the speedometer, you’ll know when to shift up.

With either method, you may learn to use engine sounds to know when to shift.

2.3 – Backing Safely
Correct shifting is important. If you can’t get your vehicle into the right gear while driving, you will have less control.

2.3.1 – Manual Transmissions
Basic Method for Shifting Up. Most heavy vehicles with manual transmissions require double clutching to change gears. This is the basic method:

Release accelerator, push in clutch and shift to neutral at the same time
Release clutch
Let engine and gears slow down to the rpm required for the next gear (this takes practice)
Push in clutch and shift to the higher gear at the same time and
Release clutch and press accelerator at the same time

Shifting gears using double clutching requires practice. If you remain too long in neutral, you may have difficulty putting the vehicle into the next gear. If so, don’t try to force it. Return to neutral, release clutch, increase engine speed to match road speed, and try again.

2.3.2 – Basic Procedures for Shifting Down
Release accelerator, push in clutch, and shift to neutral at the same time
Release clutch

Get out of the vehicle and check your path if you are unsure.

Back Slowly. Always back as slowly as possible. Use the lowest reverse gear. That way you can more easily correct any steering errors. You also can stop quickly if necessary.

Use a helper whenever possible.

Use Road Speed (mph). Learn what speeds each gear is good for. Then, by using the speedometer, you’ll know when to shift up.

With either method, you may learn to use engine sounds to know when to shift.

Basic Procedures for Shifting Down
Release accelerator, push in clutch, and shift to neutral at the same time
Release clutch
2.3.2 – Multi-speed Rear Axles and Auxiliary Transmissions

Multi-speed rear axles and auxiliary transmissions are used on many vehicles to provide extra gears. You usually control them by a selector knob or switch on the gearshift lever of the main transmission. There are many different shift patterns. Learn the right way to shift gears in the vehicle you will drive.

2.3.3 – Automatic Transmissions

Some vehicles have automatic transmissions. You can select a low range to get greater engine braking when going down grades. The lower ranges prevent the transmission from shifting up beyond the selected gear (unless the governor rpm is exceeded). It is very important to use this braking effect when going down grades.

2.3.4 – Retarders

Some vehicles have “retarders.” Retarders help slow a vehicle, reducing the need for using your brakes. They reduce brake wear and give you another way to slow down. There are four basic types of retarders (exhaust, engine, hydraulic, and electric). All retarders can be turned on or off by the driver. On some vehicles the retarding power can be adjusted. When turned “on,” retarders apply their braking power (to the drive wheels only) whenever you let up on the accelerator pedal all the way.

Because these devices can be noisy, be sure you know where their use is permitted.

Caution. When your drive wheels have poor traction, the retarder may cause them to skid. Therefore, you should turn the retarder off whenever the road is wet, icy, or snow covered.

2.4 – Seeing

To be a safe driver you need to know what’s going on all around your vehicle. Not looking properly is a major cause of crashes.

2.4.1 – Seeing Ahead

All drivers look ahead, but many don’t look far enough ahead.

Importance of Looking Far Enough Ahead. Because stopping or changing lanes can take a lot of distance, knowing what the traffic is doing on all sides of you is very important. You need to look well ahead to make sure you have room to make these moves safely.

How Far Ahead to Look. Most good drivers look at least 12 to 15 seconds ahead. That means looking ahead the distance you will travel in 12 to 15 seconds. At lower speeds, that’s about one block. At highway speeds it’s about a quarter of a mile. If you’re not looking that far ahead, you may have to stop quickly or make quick lane changes. Looking 12 to 15 seconds ahead doesn’t mean not paying attention to things that are closer. Good drivers shift their attention back and forth, near and far. Figure 2.6 illustrates how far to look ahead.

Subsections 2.2.2 and 2.3 Test Your Knowledge

1. Why should you back toward the driver’s side?
2. If stopped on a hill, how can you start moving without rolling back?
3. When backing, why is it important to use a helper?
4. What’s the most important hand signal that you and the helper should agree on?
5. What are the two special conditions where you should downshift?
6. When should you downshift automatic transmissions?
7. Retarders keep you from skidding when the road is slippery. True or False?
8. What are the two ways to know when to shift?

These questions may be on the test. If you can’t answer them all, reread subsections 2.2 and 2.3.

Field of View Using a Convex Mirror

Figure 2.7

Many large vehicles have curved (convex, “fish-eye,” “spot,” “bugeye”) mirrors that show a wider area than flat mirrors. This is often helpful. But everything appears smaller in a convex mirror than it would if you were looking at it directly. Things also seem farther away than they really are. It’s important to realize this

Lane Changes. You need to check your mirrors to make sure no one is alongside you or about to pass you. Check your mirrors:

Before you change lanes to make sure there is enough room;
After you have signaled, to check that no one has moved into your blind spot;
Right after you start the lane change, to double-check that your path is clear;
After you complete the lane change.

Turns. In turns, check your mirrors to make sure the rear of your vehicle will not hit anything.

Merges. When merging, use your mirrors to make sure the gap in traffic is large enough for you to enter safely.

Tight Maneuvers. Any time you are driving in close quarters, check your mirrors often. Make sure you have enough clearance.

How to Use Mirrors. Use mirrors correctly by checking them quickly and understanding what you see:

When you use your mirrors while driving on the road, check quickly. Look back and forth between the mirrors and the road ahead. Don’t focus on the mirrors for too long. Otherwise, you will travel quite a distance without knowing what’s happening ahead.

Look for Traffic. Look for vehicles coming onto the highway, into your lane, or turning. Watch for brake lights from slowing vehicles. By seeing these things far enough ahead, you can change your speed, or change lanes, if necessary, to avoid a problem. If a traffic light has been green for a long time, it will probably change before you get there. Start slowing down and be ready to stop.

2.4.2 – Seeing to the Sides and Rear

It’s important to know what’s going on behind and to the sides. Check your mirrors regularly. Check more often in special situations.

Mirror Adjustment. Mirror adjustment should be checked prior to the start of any trip and can only be checked accurately when the trailer(s) are straight. You should check and adjust each mirror to show some part of the vehicle. This will give you a reference point for judging the position of the other images.

Regular Checks. You need to make regular checks of your mirrors to be aware of traffic and to check your vehicle.

Traffic. Check your mirrors for vehicles on either side and in back of you. In an emergency, you may need to know whether you can make a quick lane change. Use your mirrors to spot overtaking vehicles. There are “blind spots” that your mirrors cannot show you. Check your mirrors regularly to know where other vehicles are around you, and to see if they move into your blind spots.

Check Your Vehicle. Use the mirrors to keep an eye on your tires. It’s one way to spot a tire fire. If you’re carrying open cargo, you can use the mirrors to check it. Look for loose straps, ropes, or chains. Watch for a flapping or ballooning tarp.

Special Situations. Special situations require more than regular mirror checks. These are lane changes, turns, merges, and tight maneuvers.
Warn other drivers in any of the following situations:

You could cause an accident. You could be blamed and it could cost you many thousands of dollars.

### 2.5 – Communicating

#### 2.5.1 – Signal Your Intentions

Other drivers can’t know what you are going to do until you tell them. Here are some general rules for signaling:

- **Turns.** There are three good rules for using turn signals:
  - Signal early. Signal well before you turn. It is the best way to keep others from trying to pass you.
  - Signal continuously. You need both hands on the wheel to turn safely. Don’t cancel the signal until you have completed the turn; and
  - Cancel your signal. Don’t forget to turn off your turn signal after you’ve turned (if you don’t have self-canceling signals).

- **Slowing Down.** Warn drivers behind you when you see you’ll need to slow down. A few light taps on the brake pedal — enough to flash the brake lights — should warn following drivers. Use the four-way emergency flashers for times when you are driving very slowly or are stopped. Warn other drivers in any of the following situations:
  - Trouble Ahead. The size of your vehicle may make it hard for drivers behind you to see hazards ahead. If you see a hazard that will require slowing down, warn the drivers behind by flashing your brake lights;
  - Tight Turns. Most car drivers don’t know how slowly you have to go to make a tight turn in a large vehicle. Give drivers behind you warning by braking early and slowing gradually;
  - Stopping on the Road. Truck and bus drivers sometimes stop in the roadway to unload cargo or passengers, or to stop at a railroad crossing. Warn following drivers by flashing your brake lights. Don’t stop suddenly;
  - Driving Slowly. Drivers often do not realize how fast they are catching up to a slow vehicle until they are very close. If you must drive slowly, alert following drivers by turning on your emergency flashers if it is legal. (Laws regarding the use of flashers differ from one state to another. Check the laws of the states where you will drive.)

- **Don’t Direct Traffic.** Some drivers try to help out others by signaling when it is safe to pass. You should not do this. You could cause an accident. You could be blamed and it could cost you many thousands of dollars.

### 2.5.2 – Communicating Your Presence

Other drivers may not have an opportunity to see your vehicle and its presence is the most important part of communicating with other drivers. Here are some ways to communicate:

- **When Passing.** Whenever you are about to pass a vehicle, pedestrian, or bicyclist, assume they don’t see you. They could suddenly move in front of you. When it is legal, tap the horn lightly or, at night, flash your lights from low to high beam and back. And, drive carefully enough to avoid a crash even if they don’t see or hear you.

- **When It’s Hard to See.** At dawn, dusk, in rain, or snow, you need to make yourself easier to see. If you are having trouble seeing other vehicles, other drivers will have trouble seeing you. Turn on your lights. Use the headlights, not just the identification or clearance lights. Use the low beams; high beams can bother people in the daytime as well as at night.

- **When Parked at the Side of the Road.** When you pull off the road and stop, be sure to turn on the four-way emergency flashers. This is important at night. Don’t trust the taillights to give warning. Drivers have crashed into the rear of a parked vehicle because they thought it was moving normally.

| Figure 2.8 & 2.9
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If you must stop on a road or the shoulder of any road, you must put out your emergency warning devices within ten minutes. Place your warning devices at the following locations:

- If you must stop on or by a one-way or divided highway, place warning devices within 100 feet, 100 feet, and 200 feet toward the approaching traffic. See Figure 2.8.
- If you stop on a two-lane road carrying traffic in both directions or on an undivided highway, place warning devices within 100 feet of the front or rear corners to mark the location of the vehicle and 100 feet behind and ahead of the vehicle, on the shoulder or on the lane you stopped in. See Figure 2.9.
- Back beyond any hill, curve, or obstruction that prevents other drivers from seeing the vehicle within 500 feet. If line of sight view is obstructed due to hill or curve, move the rear-most triangle to a point back down the road so warning is provided. See Figure 2.10.

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<td>If line of sight view is obstructed due to hill or curve, move the rear-most triangle to a point back down the road so warning is provided.</td>
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- **Use Your Horn When Needed.** Your horn can let others know you’re there. It can help to avoid a crash. Use your horn when needed. However, it can startle others and could be dangerous when used unnecessarily.

### 2.6 – Controlling Speed

Driving too fast is a major cause of fatal crashes. You must adjust your speed depending on driving conditions. These include traction, curves, visibility, traffic and hills.

#### 2.6.1 – Stopping Distance

Perception Distance + Reaction Distance + Braking Distance = Total Stopping Distance

**Perception Distance.** The distance your vehicle travels, in ideal conditions, from the time your eyes see a hazard until your brain recognizes it. Keep in mind certain mental and physical conditions can affect your perception distance. It can be affected greatly depending on visibility and the hazard itself. The average perception time for an alert driver is 1½ seconds. At 55 mph this accounts for 142 feet traveled.

**Reaction Distance.** The distance you will continue to travel, in ideal conditions, before you physically hit the brakes, in response to a hazard seen ahead. The average driver has a reaction time of 6 seconds to 1 second. At 55 mph this accounts for 61 feet traveled.

**Braking Distance.** The distance your vehicle will travel, in ideal conditions, while you are braking. At 55 mph on dry pavement with good brakes, it can take about 216 feet.

**Total Stopping Distance.** The total minimum distance your vehicle must travel to stop safely from the time you recognize a hazard and apply the brakes. At 55 mph, your vehicle will travel a minimum of 419 feet. See Figure 2.11.

Section 2 — Driving Safely

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Section 2 — Driving Safely

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Section 2 — Driving Safely

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Wet roads can double stopping distance. You must drive harder to turn without skidding, when the road is slippery.

### Slippery Surfaces

- You can’t steer or brake a vehicle unless you have traction.
- Empty trucks require greater stopping distances because an empty vehicle has less traction.
- The brakes, the springs, and shock absorbers on heavy vehicles are designed to work best when the vehicle is fully loaded. Empty trucks require greater stopping distances because an empty vehicle has less traction.
- You may not be able to steer or brake. You can regain traction by releasing the accelerator and pushing in the clutch. This will slow your vehicle and let the wheels turn freely.
- If the vehicle is hydroplaning, do not use the brakes to slow down. If the drive wheels start to skid, push in the clutch to let them turn freely.
- Hydroplaning will wash the oil away; the surface is probably starting to ice up.
- Black ice. Black ice is a thin layer that is clear enough that you can see the road underneath it. It makes the road very slippery. If the rain continues, it will wash the oil away.
- Hydroplaning in some weather, water or slush collects on the road. When this happens, your vehicle can hydroplane. It’s like water sking—the tires lose their contact with the road and have little or no traction.
- With ice on the road, your vehicle is probably starting to ice up.
- If there is ice on these, the road surface is probably starting to ice up.
- Just After Rain Begins: Right after it starts to rain, the water mixes with oil left on the road by vehicles. This makes the road very slippery. If the rain continues, it will wash the oil away.
- Hydroplaning: In some weather, water or slush collects on the road. When this happens, your vehicle can hydroplane. It’s like water sking—the tires lose their contact with the road and have little or no traction.
- You may not be able to steer or brake.
- You can regain control by releasing the accelerator and pushing in the clutch. This will slow your vehicle and let the wheels turn freely.
- If the vehicle is hydroplaning, do not use the brakes to slow down.
- If the drive wheels start to skid, push in the clutch to let them turn freely.
- It does not take a lot of water to cause hydroplaning. Hydroplaning can occur at speeds as low as 30 mph if there is even a little bit of water. Hydroplaning is even more likely if tire pressure is low, or the tread is worn.
- (The grooves in a tire carry away the water; if they aren’t deep, they don’t work well.)
- Road surfaces where water can collect can create conditions that cause a vehicle to hydroplane. Watch for clear reflections, tire splashes, and raindrops on the road. These are indications of standing water.

### Subsections 2.4, 2.5, and 2.6

#### 2.6.1 – Speed and Distance Ahead

You should be able to stop within the distance you can see ahead. Fog, rain, or other conditions may require that you slow down to be able to stop in the distance you can see. At night, you can’t see as far with low beams as you can with high beams. When you must use low beams, slow down.

#### 2.6.5 – Speed and Traffic Flow

When you’re driving in heavy traffic, the safest speed is the speed of other vehicles. Vehicles going the same direction at the same speed are not likely to run into one another. In many states, speed limits are lower for trucks and buses than for cars. It can vary as much as 15 mph.

Use extra caution when you change lanes or pass on these roadways. Drive at the speed of the traffic, if you can without going at an illegal or unsafe speed. Keep a safe following distance.

The main reason drivers exceed speed limits is to save time. But, anyone trying to drive faster than the speed of traffic will not be able to save much time. The risks involved are not worth it. If you go faster than the speed of other traffic, you’ll have to keep passing other vehicles. This increases the chance of a crash, and it is more tiring. Fatigue increases the chance of a crash. Going with the flow of traffic is safer and easier.

#### 2.6.6 – Speed on Downgrades

Your vehicle’s speed will increase on downgrades because of gravity. Your most important objective is to select and maintain a speed that is not too fast for the:
- Total weight of the vehicle and cargo;
- Length of the grade;
- Speed at the bottom of the grade;
- Road conditions; and
- Weather.

If a speed limit is posted, or there is a sign indicating “Maximum Safe Speed,” never exceed the speed shown. Also, look for and heed warning signs indicating the length and steepness of the grade. You must use the braking effect of the engine as the principal way of controlling your speed on downgrades. The braking effect of the engine is greatest when it is near the governed rpm and the transmission is in the lower gears. Save your brakes so you will be able to slow or stop as required by road and traffic conditions. Shift your transmission to a low gear before starting down the grade and use the proper braking techniques. Please read carefully the section on going down long, steep downgrades safely in “Mountain Driving.”

#### 2.6.7 – Roadway Work Zones

Speeding traffic is the number one cause of injury and death in roadway work zones. Observe the posted speed limits at all times when approaching and driving through a work zone. Watch your speedometer, and don’t allow your speed to creep up as you drive through long sections of road construction. Decrease your speed for adverse weather or road conditions. Decrease your speed even further when a worker is close to the roadway.

#### 2.7 – Managing Space

To be a safe driver, you need space all around your vehicle. When things go wrong, space gives you time to think and to take action.

To have space available when something goes wrong, you need to manage space. While this is true for all drivers, it is very important for large vehicles. They take up more space and they require more space for stopping and turning.

#### 2.7.1 – Space Ahead

All of the space around your vehicle is the area ahead of the vehicle—the space you’re driving into—that is most important.

The Need for Space Ahead. You need space ahead in case you must suddenly stop. According to accident reports, the vehicle that trucks and buses most often run into is the one in front of them. The most frequent cause is following too closely. Remember, if the vehicle ahead of you is smaller than yours, it can probably stop faster than you can. You may crash if you are following too closely.
Section 2 — Driving Safely

2.7.2 – Space Behind

How much space you have, wait until the vehicle ahead passes a shadow on the road, a paving marking, or some other clear landmark. Then count off the seconds like this: “one thousand and one, one thousand and two,” and so on, until you reach the same spot. Compare your count with the rule of one second for every ten feet of length.

If you are driving a 40-foot truck and only counted up to two seconds, you’re too close. Drop back a little and count off the seconds again.

2.7.3 – Space to the Sides

Commercial vehicles are often wide and take up most of a lane. Safe drivers will manage what little space they have. You can do this by keeping your vehicle centered in your lane, and avoid driving alongside others.

2.7.4 – Space Overhead

Avoid tricks (Don’t turn on your taillights or flash your lights). Don’t speed up (It’s safer to be tailgated at a low speed than a high speed.).

2.7.5 – Space Below

Heavy vehicles are often tailgated when they can’t keep up with the speed of traffic. This often happens when you’re going uphill. If a heavy load is slowing you down, stay in the right lane if you can. Going uphill, you should not pass another slow vehicle unless you can do it when you are empty.

Dealing with Tailgaters Safely. In a large vehicle, it’s often hard to see whether a vehicle is close behind you. You may be tailgated:

- When you are traveling slowly (Drivers trapped behind slow vehicles often follow closely);
- In bad weather (Many car drivers follow large vehicles closely during bad weather, especially when it is hard to see the road ahead);
- If you find yourself being tailgated, here are some things you can do to reduce the chances of a crash;
  - Avoid quick changes (If you have to slow down or turn, signal early, and reduce speed very gradually);
  - Increase your following distance (Opening up room in front of you will help you to avoid having to make sudden speed or direction changes. It also makes it easier for the tailgater to get around you);
  - Don’t speed up (It’s safer to be tailgated at a low speed than a high speed.);
- Avoid tricks (Don’t turn on your taillights or flash your brake lights. Follow the suggestions above.).

2.7.6 – Space for Turns

In a large vehicle, it’s often

2.7.7 – Space Needed to Cross or Enter Traffic

Be aware of the size and weight of your vehicle when you cross or enter traffic. Here are some important things to keep in mind:

- Because of slow acceleration and the space large vehicles require, you may need a much larger gap to enter traffic than you would in a car;
- Acceleration varies with the load. Allow more room if your vehicle is heavily loaded.
- Before you start across a road, make sure you can get all the way across before traffic reaches you.
2.8 – Seeing Hazards

2.8.1 – Importance of Seeing Hazards

What Is a Hazard? A hazard is any road condition or other road user (driver, bicyclist, pedestrian) that is a possible danger to you, your vehicle, or those in your vehicle.

2.8.2 – Hazardous Roads

Slow down and be very careful if you see any of the following road hazards.

Work Zones. When people are working on the road, it is important to be prepared to stop. Drivers entering the road may pull in front of you in order to lead to a crash.

Drop Off. Sometimes the pavement drops off sharply near the edge of the road. Driving too near the edge can be hazardous. You may sometimes get a hazy vision or unclear surfaces. Other drivers are often distracted and drive unsafe. Workers and construction vehicles may be partly hidden by blind intersections or alleys. Other situations include slow moving traffic or picking up a turn signal. Other drivers may be going to make a turn, even though the turn signal isn’t on. Drivers making over-the-shoulder checks may be hazardous. You must be alert for drivers who are in a hurry.

Distractions. Other drivers or pedestrians talking to one another may be hazardous. People in and around shopping areas are often distracted and drive unsafe. Workers or pedestrians talking to one another may be hazardous. When they react to this conflict, they may do something that will put them in conflict with you. Confused Drivers. Watch for other drivers who are in conflict because they are lost or not paying close attention to the traffic. Accidents. In common near freeway or turnpike interchanges and major intersections, drivers unfamiliar with the area can be very hazardous. Clues to tourists include car-top luggage and out-of-state license plates. Unexpected actions (stopping in the middle of a block, changing lanes for no apparent reason, backup lights suddenly going on) are clues to confusion. Hesitation is another clue, including driving very slowly; using brakes often, or stopping in the middle of an intersection. You may also see drivers who are looking at street signs, maps, and house numbers. These drivers may not be aware of other traffic.

Slow Drivers. Motorists who fail to maintain normal speed are hazardous. See slow-moving vehicles early can prevent a crash. Some vehicles, by their nature, are slow and seeing them is a hazard (snakes, farm machinery, construction machinery, tractors, etc.). Some of these will have the “slow-moving vehicle” symbol to warn you. This is a red triangle with a white background. Watch for it.

Drivers Signaling a Turn May Be a Hazard. Drivers signaling a turn may slow more than expected or stop. If they are making a tight turn through an alley or driveway, they may go very slowly. If pedestrians or other vehicles block their way, they may have to stop on the roadway. Vehicles turning left may have to stop for oncoming vehicles.

Drivers in a Hurry. Drivers may feel your commercial vehicle is preventing them from getting where they want to go on time. Such drivers may pass you without a safe gap in the oncoming traffic, cutting too close in front of you. Drivers entering the road may pull in front of you in order to avoid being stuck behind you, causing you to brake. Be aware of this and watch for drivers who are in a hurry.

Impaired Drivers. Drivers who are sleepy, have had too much to drink, are on drugs, or who are ill are hazards. Some clues to these drivers are:

- Severe range of difficulty driving or your ability to maintain normal speed; and
- Stopping at the wrong time (stopping at a green light, or waiting for too long at a stop);
- Opening a window in cold weather; and
- Speeding up or slowing down suddenly, driving too fast or too slow.

Be alert for drunk drivers and sleepy drivers late at night.

Driver Body Movement as a CLue. Drivers look in the direction they are going to turn. You may sometimes get a hazy vision or unclear surfaces. Other drivers are often distracted and drive unsafe. Slow drivers or drivers talking to one another may do something hazardous. You must be alert for drivers who are in a hurry.

Confscts. In common near freeway or turnpike interchanges and major intersections, drivers unfamiliar with the area can be very hazardous. 

Children. Children tend to act quickly without checking traffic. Children playing with one another may not look for oncoming traffic and are a serious hazard.

Talkers. Drivers or pedestrians talking to one another may not be paying close attention to the traffic.

Workers. People working on or near the roadway are a hazard. They may be looking for oncoming traffic and not watching traffic because they are looking for stores or looking into store windows.

Disabled Vehicles. Disabled vehicles are a hazard to you. When they react to this conflict, they may do something that will put them in conflict with you.

2.8.4 – Always Have a Plan

You should always be looking for hazards. Continue to learn to see hazards on the road. However, don’t forget why you are looking for them. You may also be looking for hazards as you may be in conflict with them. You look for the hazards in order to have time to plan a way out of any emergency. When you see a hazard, think about the other hazards that could develop and figure out what you would do. Always be prepared to take action based on your plans. In this way, you will be a prepared, defensive driver who will improve your own safety as well as the safety of all road users.
Test Your Knowledge

1. How do you find out how many seconds of following distance space you have?
2. If you are driving a 30-foot vehicle at 55 mph, how many seconds of following distance should you allow?
3. You should decrease your following distance if somebody is following you too closely. True or False?
4. If you swing wide to the left before turning right, another driver may try to pass you on the right. True or False?
5. What is a hazard?
6. Why make emergency plans when you see a hazard?

These questions may be on the test. If you can't answer them all, reread subsections 2.7 and 2.8.

2.9 – Distracted Driving

Whenever you are driving a vehicle and your attention is not on the road, you're putting yourself, your passengers, other vehicles, and pedestrians in danger. Distracted driving can result when you perform any activity that may shift your full attention from the driving task. Taking your eyes off the road or hands off the steering wheel presents obvious driving risks. Mental activities that take your mind away from driving are just as dangerous. Your eyes can gaze at objects in the driving scene but fail to see them because your attention is distracted elsewhere.

Activities that can distract your attention include: talking to passengers; adjusting the radio, CD player or climate controls; eating, drinking or smoking; reading maps or other literature; picking up something that fell; reading letters, maps or other literature; and associates while on the road. Never use the cell phone for social visiting.

Avoid smoking, eating and drinking while you drive; Don't attempt to read or write while you drive; Do not attempt to type or read messages on your satellite navigation system while driving.

2.9.1 – Don’t Drive Distracted

If drivers react a half-second slower because of distraction, collisions increase. As a result, the number of drivers being killed or injured in collisions increases. Some tips to follow so you won't become distracted.

- Review and be totally familiar with all safety and usage features on any in-vehicle electronics, including your wireless or cell phone, before you drive;
- Pre-program radio stations;
- Pre-load your favorite CDs or cassette tapes;
- Clear the vehicle of any unnecessary objects;
- Review maps and plan your route before you begin driving;
- Adjust all mirrors for best all-round visibility before you start your trip;
- Don’t attempt to read or write while you drive;
- Avoid smoking, eating and drinking while you drive;
- Don’t engage in complex or emotionally intense conversations with other occupants.

2.9.2 – Use In-Vehicle Communication Equipment Cautiously

If possible, turn the cell phone off until your destination is reached.

- Position the cell phone within easy reach;
- Pre-program cell phones with commonly called numbers;
- If you have to place a call, find a safe place to pull off the road. Do not place a call while driving;
- Some jurisdictions require that only hands-free devices can be used while driving. Even these devices are unsafe to use when you are moving down the road;
- If you must use your cell phone, keep conversations short.

Develop ways to get free of long-winded friends and associates while on the road. Never use the cell phone for social visiting.

Hang up in tricky traffic situations;

- Do not use the equipment when approaching locations with heavy traffic, road construction, heavy pedestrian traffic, or severe weather conditions; and
- Do not attempt to type or read messages on your satellite navigation system while driving.

2.9.3 – Watch Out for Other Distracted Drivers

You need to be able to recognize other drivers who are engaged in any form of driving distraction. Not recognizing other distracted drivers can prevent you from perceiving or reacting correctly in time to prevent a crash. Watch for:

- Vehicles that may drift over the lane divider lines or within their own lane;
- Vehicles traveling at inconsistent speeds;
- Drivers who are preoccupied with maps, food, cigarettes, cell phones, or other objects, and;
- Drivers who appear to be involved in conversations with their passengers.

Give a distracted driver plenty of room and maintain your safe following distance.

Be very careful when passing a driver who seems to be distracted. The other driver may not be aware of your presence, and they may drift in front of you.

2.10 – Aggressive Drivers/Road Rage

2.10.1 – What Is It?

Aggressive driving and road rage is not a new problem. However, in today’s world, where heavy and slow-moving traffic and tight schedules are the norm, more and more drivers are taking out their anger and frustration in their vehicles.

Crowded roads leave little room for error, leading to suspicion and hostility among drivers and encouraging them to take personal mistakes of other drivers.

Aggressive driving is the act of operating a motor vehicle in a selfish, bold, or pushy manner, without regard for the rights or safety of others.

Road rage is operating a motor vehicle with the intent of doing harm to others or physically assaulting a driver or their vehicle.

2.10.2 – Don’t Be an Aggressive Driver

How you feel before you even start your vehicle has a lot to do with how stress will affect you while driving.

- Reduce your stress before and while you drive. Listen to “easy listening” music;
- Give the drive your full attention. Don’t allow yourself to become distracted by talking on your cell phone, eating, etc.;
- Be realistic about your travel time. Expect delays because of traffic, construction, or bad weather and make allowances;
- If you’re going to be later than you expected – deal with it. Take a deep breath and accept the delay;
- Give other drivers the benefit of the doubt. Try to imagine why he or she is driving that way. Whatever their reason, it has nothing to do with you;
- Slow down and keep your following distance reasonable;
- Don’t drive slowly in the left lane of traffic;
- Avoid gesturing. Keep your hands on the wheel. Avoid making any gestures that might anger another driver, even if it is an apparently harmless expression of irritation like shaking your head;
- Be a cautious and courteous driver. If another driver seems to be endangering you, say, “Be my guest.” This response will soon become a habit and you won’t be as offended by other drivers’ actions.

2.10.3 – What You Should Do When Confronted by an Aggressive Driver

First and foremost, make every attempt to get out of their way;

- Put your pride in the back seat. Do not challenge them by speeding up or attempting to “hold your own” in your travel lane;
- Avoid eye contact;
- Ignore gestures and refuse to react to them;
- Report aggressive drivers to the appropriate authorities by providing a vehicle description, license number, location and, if possible, direction of travel;

2.11 – Driving at Night

2.11.1 – It’s More Dangerous

You are at greater risk when you drive at night. Drivers can’t see hazards as quickly as in day light, so they have less time to respond. Drivers are less able to avoid a crash. The problems of night driving involve the driver, the roadway, and the vehicle.

2.11.2 – Driver Factors

Vision. People can’t see as sharply at night or in dim light. Also, their eyes need time to adjust to seeing in dim light. Most people have noticed this when walking into a dark movie theater.

Glare. Drivers can be blinded for a short time by bright lights. It takes time to recover from this blindness. Older drivers are especially bothered by glare. Most people have been temporarily blinded by camera flash units or by the high beams of an oncoming vehicle. It can take several seconds to recover from glare. Even two seconds of glare blindness can be dangerous. A vehicle going 55 mph will travel more than half the distance of a football field during that time. Don’t look directly at bright lights when driving.

2.11.3 – Road Factors

Sideshadow. When someone coming toward you has very bright lights on.

Fatigue and Lack of Alertness. Fatigue (being tired) and lack of alertness are bigger problems at night. The body’s

Test Your Knowledge

1. What are some tips to follow so you won’t become a distracted driver?
2. How do you use in-vehicle communications equipment cautiously?
3. How do you recognize a distracted driver?
4. What is the difference between aggressive driving and road rage?
5. What should you do when confronted with an aggressive driver?
6. What are some things you can do to reduce your stress before and while you drive?

These questions may be on the test. If you can’t answer them all, reread subsections 2.9 and 2.10.
Other Lights. It is a good idea to have your lights adjusted properly. Have a qualified person make sure they are adjusted properly. If they don't point in the right direction, your lights are clean and working. Headlights can be out of adjustment and not shine where you think they should. This can make it harder for others to see you. Make sure you have clean, working turn signals and stop lights.

Windshield and Mirrors. It is more important at night than in the daytime to have a clean windshield and clean mirrors. Bright light shining directly on your windshield or mirrors can create a glare of its own, blocking your view. Most people have experienced driving toward the sun just as it has risen or is about to set. You may have found that they can barely see through a windshield that seemed to look OK in the middle of the day. Clean your windshield on the inside and outside for safe driving at night.

Night driving can be more dangerous if you have problems with your headlights. Difficult headlights may give less light than they should, and may cast a shadow on your headlight. This may make it harder for others to see you. Make sure your lights are clean and working. Headlights can be out of adjustment, by the time you see a shadow, you will not have time to stop.

Night driving can be more dangerous if you have problems with your headlights. Difficult headlights may give less light than they should, and may cast a shadow on your headlight. This may make it harder for others to see you. Make sure your lights are clean and working. Headlights can be out of adjustment, by the time you see a shadow, you will not have time to stop.

2.11.5 – Night Driving Procedures

Pre-Trip Procedures. Make sure you are rested and alert. If you are drowsy, sleep before you drive! Even a nap can save your life or the lives of others. If you wear eyeglasses, make sure they are clean and unscratched. Don't wear sunglasses at night. Do a complete pre-trip inspection of your vehicle. Pay attention to checking all lights and reflectors, and cleaning those you can reach.

Avoid Blinding Others. Glare from your headlights can cause problems for drivers coming toward you. They can also bother drivers going in the same direction as you when, you drive near them in rearview mirrors. Dim your headlights before you go ahead of them. Dim your lights within 500 feet of an oncoming vehicle and when following another vehicle within 500 feet.

Avoid Glare from Oncoming Vehicles. Do not look directly at lights when you are oncoming. If other drivers don't put their low beams on, don't try to get back at them by putting your own high beams on. This increases glare for oncoming drivers and increases the chance of a crash.

Use High Beams When You Can. Some drivers make the mistake of always using low beams. Also, don't let the inside of your cab get too bright. This makes it harder to see outside. Keep the interior light off, and adjust your instrument lights so you can still be able to read the gauges.

If You Get Sleepy, Stop at the Nearest Safe Place. People often don't realize how close they are to falling asleep even when their eyes are fully open. You can safely do so, look at yourself in a mirror. If you look sleepy, or you just feel sleepy, stop driving! You are in a very dangerous condition. The only safe cure is to sleep.

2.12 – Driving in Fog

Fog can occur at any time. Fog on highways can be extremely dangerous. Fog is often unexpected, and visibility can deteriorate rapidly. You should watch for foggy conditions and be ready to reduce your speed. Do not assume that the fog will thin out after you enter it. The best advice for driving in fog is do it. It is preferable that you put your windshield wipers on intermittent and put on your high beams. Put on your windshield wipers with the wipers and high beams on. This will give vehicles approaching you from behind a quicker opportunity to notice your vehicle; Watch for vehicles on the side of the roadway. Seeing taillights or headlights in front of you may not be a true indication of where the road is ahead of you. The vehicle may not be on the road at all; Use roadside highway reflectors as guides to determine how the road may curve ahead of you; Listen for traffic that you cannot see, Avoid passing other vehicles, and Don't stop along the side of the road, unless absolutely necessary.

2.13 – Driving in Winter

2.13.1 – Vehicle Checks

Make sure your vehicle is ready for driving in winter weather. You should make a regular pre-trip inspection, paying extra attention to the following:

Coolant Level and Antifreeze Amount. Make sure the cooling system is full and there is enough antifreeze in the system to provide against freezing. This can be checked with a special coolant tester.

Defrosting and Heating Equipment. Make sure the defrosters work. They are needed for safe driving. Make sure the heater is working, and that you know how to operate it. If you use other heaters and expect to need them (e.g., mirror heaters, battery box heaters, fuel tank heaters), check their operation.

Wipers and Washers. Make sure the windshield wiper blades are in good condition. Make sure the wiper blades press against the window hard enough to wipe the windshield clean, otherwise they may not sweep off snow properly. Replace the windshield wiper works and there is washing fluid in the washer reservoir.

Use windshield washer antifreeze to prevent freezing of the washer liquid. If you can't see well enough while driving, (for example, if your wipers fail), stop safely and fix the problem.
Section 2 — Driving Safely

2.23

Possible. If not, you should:

Avoid driving through deep puddles or flowing water if

a trailer.

Water in the brakes

Wet Brakes.

Try hard to anticipate stops early and slow down gradually.

vehicles. Keep a longer following distance. When you see a

more slippery. Slow down more.

Wet Brakes. When driving in heavy rain or deep stand-

ing water, your brakes will get wet. Water in the brakes

can cause the brakes to be weak, to apply unevenly, or to

-DON'T- apply them. Watch for snowplows, as well as salt and sand trucks, and

give them plenty of room.

Engine Oil.

When out of the water, maintain light pressure on the

When coolant has to be added to a system without a recovery

tank or overflow tank, follow these steps:

Do not apply too much

To assist you in recognizing a crossing.

are drowsy?

Figure 2.17 (insert) & 2.18

Flash the lights, with or without bells, and flashing red lights with

Flashing Red Light Signals. At many highway-rail grade crossings, the crossbuck sign has flashing red lights and

bells. When the lights begin to flash, stop! A train is ap-

proaching. You are required to yield the right-of-way to the train. If there is no white line painted on the pavement, you must stop at the

crossing. Crossbuck Signs. This sign marks the grade crossing. It

requires you to yield the right-of-way to the train. If there is no white line painted on the pavement, you must stop the

bus before the crossbuck sign. When the road crosses over

more than one set of tracks, a sign below the crossbuck

indicates the number of tracks. See Figure 2.17.

2.14 – Driving in Very Hot Weather

2.14.1 – Vehicle Checks

Do a normal pre-trip inspection, but pay special attention to the following items:

Tires. Check the tire mounting and air pressure. Inspect the tires every two hours or every 100 miles when driv-

ing in very hot weather. Air pressure increases with temperature. Do not let air out or the pressure will be too

low when the tires cool off. If a tire is too hot to touch, remain stopped until the tire cools off. Otherwise the tire

may blow out or catch fire.

Engine Oil. The engine oil helps keep the engine cool, as well as lubricating it. Make sure there is enough engine oil.

If you have an oil temperature gauge, make sure the tem-

perature is within the proper range while you are driving.

Engine Coolant. Before starting out, make sure the engine cooling system has enough water and antifreeze according to

the engine manufacturer's directions. (Antifreeze helps

the engine under hot conditions as well as cold conditions.)

When driving, check the water temperature or coolant

temperature gauge from time to time. Make sure that it

remains in the normal range. If the gauge goes above the

highest safe temperature, there may be something wrong

that could lead to engine failure and possible fire. Stop

driving as soon as safely possible and try to find out what

is wrong.

Some vehicles have sight glasses. See-through coolant

overflow containers, or coolant recovery containers. These

permit you to check the coolant level while the engine is

hot. If the container is not part of the pressurized system,

the cap can be safely removed and coolant added even

when the engine is at operating temperature.

Never remove the radiator cap or any part of the pressur-

ized system until the system has cooled. Steam and boiling

water can vapor under pressure and cause severe burns. If

you can touch the radiator cap with your bare hand, it is

probably cool enough to open.

If coolant has to be added to a system without a recovery

tank or overflow tank, follow these steps:

1. Shut engine off.

2. Wait until engine has cooled;

3. Protect yourself with gloves or a thick cloth;

4. Turn radiator cap slowly to the first stop, which releases

the pressure seal;

5. Step back while pressure is released from cooling system;

6. When all pressure has been released, press down on the

hinges and turn radiator cap further to remove it;

7. Replace cap and turn it further to remove it;

8. Shut engine off;

9. Increase engine rpm and cross the water while keeping

light pressure on the brakes;

10. When out of the water, maintain light pressure on the

brakes for a short distance to heat them up and dry

them out; and

11. Make a test stop when safe to do so. Check behind to

make sure no one is following, then apply the brakes to

be sure they work well. If they don't, dry them out further as

described above. (CAUTION: Do not apply too much

brake pressure or accelerator at the same time, or you

can overheat brake drums and lining.)

2.14.2 – Driving

Watch for Bleeding Tar. Tar in the road pavement fre-

quently rises to the surface in very hot weather. Spots where tar “bleeds” to the surface are very slippery.

Go Slowly Enough to Prevent Overheating. High speeds

create more heat for tires and the engine. In desert condi-

tions the heat may build up to the point where it is danger-

ous. The heat will increase chances of tire failure or even

fire, and engine failure.

2.15 – Railroad/Highway Crossings

Railroad-highway grade crossings are a special kind of

intersection where the roadway crosses train tracks. These

crossings are always dangerous. Every such crossing must

be approached with the expectation that a train is coming.

2.15.1 – Types of Crossings

Passive Crossings. This type of crossing does not have any

type of traffic control device. The decision to stop or

proceed rests entirely in your hands. Passive crossings

require you to recognize the crossing, search for any train

using the tracks and decide if there is sufficient clear space
to cross safely. Passive crossings have yellow circular ad-

vance warning signs, pavement markings and crossbucks to

assist you in recognizing a crossing.

Active Crossings. This type of crossing has a traffic control
device installed at the crossing to regulate traffic at the
crossing. These active devices include flashing red lights,

with or without bells, and flashing red lights with

bells and gates.

2.15.2 – Warning Signs and Devices

Advance Warning Signs. The round, black-on-yellow warning sign is placed ahead of a public railroad-highway
crossing. The advance warning sign tells you to slow down,

look and listen for the train, and be prepared to stop at the

tracks if a train is coming. See Figure 2.15.

Pavement Markings. Pavement markings mean the same

as the advance warning sign. They consist of an “X” with

letters “RR” and a no-passing marking on two-lane roads.

See Figure 2.16.
2.15.3 – Driving Procedures

Never Race a Train to a Crossing. Never attempt to race a train to a crossing. It is extremely difficult to judge the speed of an approaching train.

Reduce Speed. Speed must be reduced in accordance with your ability to see approaching trains in any direction, and speed must be reduced to a point which will permit you to stop short of the tracks in case a stop is necessary.

Don’t Expect to Hear a Train. Because of noise inside your vehicle, you cannot expect to hear the train horn until the train is dangerous close to the crossing.

Don’t Rely on Signals. You should not rely solely upon the presence of warning signals, gates, or flagmen to warn of the approach of trains. Be especially alert at crossings that do not have gates or flashing red light signals.

Double Tracks Require a Double Check. Remember that a train on one track may hide a train on the other track. Look both ways before crossing. After one train has cleared a crossing, be sure no other trains are near before starting across the tracks.

Yard Areas and Grade Crossings in Cities and Towns. Yard areas and grade crossings in cities and towns are just as dangerous as rural grade crossings. Approach them with as much caution.

2.15.4 – Stopping Safely at Railroad-Highway Crossings

A full stop is required at grade crossings whenever:
- The nature of the cargo makes a stop mandatory under state or federal regulations;
- Such a stop is otherwise required by law.

When stopping be sure to:
- Check for traffic behind you while stopping gradually.
- Use a pullout lane, if available; and
- Turn on your four-way emergency flashers.

2.15.5 – Crossing the Tracks

Railroad crossings with steep approaches can cause your unit to hang up on the tracks. Never permit traffic conditions to trap you in a position where you have to stop on the tracks. Be sure you can get to the way across the tracks both before you start across, and after you cross. It takes a typical tractor-trailer unit at least 14 seconds to clear a single track and more than 15 seconds to clear a double track.

Do not shift gears while crossing railroad tracks.

2.15.6 – Special Situations

Be Aware! These trailers can get stuck on raised crossings:
- Low slung units (lowboy, car carrier, moving van, possum-belly livestock trailer), and
- Single-axle tractor pulling a long trailer with its landing gear set to accommodate a tandem-axle tractor.

If for any reason you get stuck on the tracks, get out of the vehicle and away from the tracks. Check signals or signal housing at the crossing for emergency notification information. Call 911 or other emergency number. Give the position of the crossing, the identification of the location, the DOT number, if posted.

2.16 – Mountain Driving

In mountain driving, gravity plays a major role. On any upgrade, gravity slows you down. The steeper the grade, the longer the grade, and the heavier the load — the more you will have to use lower gears to climb hills or mountains. In coming down long, steep downgrades, gravity causes the speed of your vehicle to increase. You must select an appropriate safe speed, then use a low gear, and proper braking techniques. You should plan ahead and obtain information about any long, steep grades along your planned route of travel. If possible, talk to other drivers who are familiar with the grades to find out what speeds are safe.

You must go slowly enough so your brakes can hold you back without getting too hot. If the brakes become too hot, they may start to “fade.” This means you have to apply them harder and harder to get the same stopping power. If you continue to use the brakes hard, they can keep fading until you cannot slow down or stop at all.

2.16.1 – Select a “Safe” Speed

Your most important consideration is to select a speed that is not too fast for:
- Total weight of the vehicle and cargo;
- Length of the grade;
- Steepness of the grade;
- Road conditions; and/or
- Weather.

If a speed limit is posted, or there is a sign indicating “Maximum Safe Speed,” never exceed the speed shown. Also, look for and heed warning signs indicating the length and steepness of the grade.

You must use the braking effect of the engine as the principal way of controlling your speed. The braking effect of the engine is greatest when it is near the governed rpms and the transmission is in the lower gears. Save your brakes so you will be able to slow or stop as required by road and traffic conditions.

2.16.2 – Select the Right Gear Before Starting Down the Grade

Shift the transmission to a low gear before starting down the grade. Do not try to downshift after your speed has already built up. You will not be able to shift into a lower gear. You may not even be able to get back into any gear and all engine braking effect will be lost. Forcing an automatic transmission into a lower gear at high speed could damage the transmission and also lead to loss of all engine braking effect.

With older trucks, a rule for choosing gears is to use the same gear going down a hill that you would need to climb the hill. However, new trucks have low friction parts and streamlined shapes for fuel economy. They may also have more powerful engines. This change in the crossing sign is in higher gears and have less friction and air drag to hold them back going down hills. For that reason, drivers of modern trucks may have to use lower gears going down a hill than would be required to go up the hill. You should know what is right for your vehicle.

2.16.3 – Brake Fading or Failure

Brakes are designed so brake shoes or pads rub against the brake drum or discs to slow the vehicle. Braking creates heat, but brakes are designed to take a lot of heat. However, brakes can fade or fail from excessive heat caused by using them too much and not relying on the engine brakes. It is extremely difficult to judge the speed of a train on one track may hide a train on the other track. Brake fade is also affected by adjustment. To safely control a vehicle, every brake must do its share of the work. Brakes out of adjustment will stop doing their share before those that are in adjustment. The other brakes can then overheat and fade, and there will not be enough braking available to control the vehicle. Brakes can get out of adjustment quickly when they are hot, or too cold, also, brake linings wear faster when they are hot. Therefore, brake adjustment must be checked frequently.

2.16.4 – Proper Braking Technique

Remember. The use of brakes on a long and/or steep downgrade is only a supplement to the braking effect of the engine. Once the vehicle is in the proper low gear, the following are the proper braking techniques:
- Apply the brakes just hard enough to feel a definite slowdown;
- When your speed has been reduced to approximately five mph below your “safe” speed, release the brakes. (This brake application should last for about three seconds.);
- When your speed has increased to your “safe” speed, repeat steps 1 and 2.

For example, if your “safe” speed is 40 mph, you would not apply the brakes until your speed reaches 40 mph. You now apply the brakes hard enough to gradually reduce your speed to 35 mph and then release the brakes. Repeat this as often as necessary until you have reached the end of the downgrade.

Escape ramps have been built on many steep mountain downgrades. Escape ramps are made to stop runaway vehicles safely without injuring drivers and passengers. Escape ramps use a long bed of loose, soft material to slow a runaway vehicle, sometimes in combination with an upgrade.

Know escape ramp locations on your route. Signs show drivers where ramps are located. Escape ramps save lives, equipment and cargo.

2.17 – Driving Emergencies

Traffic emergencies occur when vehicles are about to collide. Vehicle emergencies occur when tires, brakes, or other critical parts fail. Following the safety practices in this manual can help prevent emergencies. But if an emergency does happen, you must take steps to avoid a crash. Your actions can depend upon how well you take action. Actions you can take are discussed below.

2.17.1 – Steering to Avoid a Crash

Steering is not always the safest thing to do in an emergency. When you do not have enough time to stop, you may have to steer away from what’s ahead. Remember, you can almost always turn to avoid an obstacle more quickly than you can stop. (However, top-heavy vehicles and tractors with multiple trailers may flip over.)

Keep Both Hands on the Steering Wheel. In order to turn quickly, you must have a firm grip on the steering wheel. Never have both hands on the wheel, if there is an emergency, is to keep them there all the time.

How to Turn Quickly and Safely. A quick turn can be made safely; it’s done the right way. Here are some points that safe drivers use:
- Do not apply the brake while you are turning. It’s very easy to lock your wheels while turning. If that happens, you may skid out of control;
- Do not turn any more than needed to clear whatever is in your way. The more sharply you turn, the greater the chances of a skid or rollover; and
- Do not make a wide turn.

Test Your Knowledge

1. What factors determine your selection of a “safe” speed when going down a long, steep downgrade?
2. Why should you be in the proper gear before you start driving?
3. Describe the proper braking technique when going down a long, steep downgrade.
4. What type of vehicles can get stuck on a railroad-highway crossing?
5. How long does it take for a typical tractor-trailer unit to clear a double track?

These questions may be on the test. If you can’t answer them all, reread subsections 2.15 and 2.16.
2.17.2 – How to Stop Quickly and Safely

This helps to maintain control.

Make One Set of Wheels on the Pavement, if Possible.

If you are blocked on both sides, a move to the right may be best. At least you will force anyone into an opposing traffic lane and, therefore, offer an available escape route. Here are some guidelines, if you do leave the road.

Avoid Braking, if possible, avoid using the brakes until your tires have come to a stop. Signal and check your mirrors before pulling back onto the road.

Return to the Road. If you are forced to return to the road before you can stop, use the following procedure:

1. Check the wheels to ensure that they are on the road.
2. Pull the杠杆 wheel up, the brake pedal will feel spongy or go to the floor. Here are some guidelines, if you do leave the road.

Don't Jam on the Brakes. Emergency braking does not mean pushing down on the brake pedal as hard as you can. That will only stop the wheels locked up and cause a skid. If the wheels are skidding, you cannot control the vehicle.

2.17.3 – Brake Failure

Brakes kept in good condition rarely fail. Most hydraulic brake failures occur for one of two reasons: (Air brakes are discussed in Section 5.)

Loss of hydraulic pressure; or

Brake fade on long hills.

Loss of Hydraulic Pressure. When the system won’t build up pressure, the brake pedal will feel spongy or go to the floor. Here are some guidelines, if you do leave the road.

Downshift. Putting the vehicle into a lower gear will help to slow the vehicle.

Pump the Brakes. Sometimes pumping the brake pedal will generate enough hydraulic pressure to stop the vehicle.

Use the Parking Brake. The parking or emergency brake is separate from the hydraulic brake system. Therefore, it can be used to slow the vehicle. However, be sure to press the release button or pull the lever lever at the same time you use the emergency brake so you can adjust the brake pressure and keep the wheels from locking up.

Find an Escape Route. While slowing the vehicle, look for an escape route — an open field, side street, or escape ramp. Turning uphill is a good way to slow and stop the vehicle. Make sure the vehicle does not start rolling back after you stop. Put it in low gear, apply the parking brake, and, if necessary, roll back into some obstacle that will stop the vehicle.

Brake Failure on Downgrades. Going slow enough and braking properly will almost always prevent brake failure on long downgrades. Once the brakes have failed, however, you are going to have to look outside your vehicle for something to stop it.

Your best hope is an escape ramp. If there is one, there’ll be signs telling you about it. Use it. Ramps are usually located a few miles from the top of the downgrade. Every year, hundreds of drivers avoid injury to themselves or damage to their vehicles by using escape ramps. Some escape ramps use gravel that resists the motion of the vehicle and brings it to a stop. Others turn uphill, using the hill to stop the vehicle and soft gravel to hold it in place. Any driver who loses brakes going downhill should use an escape ramp if it’s available. If you don’t use it, your chances of having a serious crash may be much greater.

If no escape ramp is available, take the least hazardous escape route you can — such as an open field or a side road. Flatten out or turn uphill. Make the move as soon as you know your brakes don’t work. The longer you wait, the faster the vehicle will go, and the harder it will be to stop.

2.17.4 – Tire Failure

Recognize Tire Failure. Quickly knowing you have a tire failure will let you have more time to react. Having just a few extra seconds to remember what it is you’re supposed to do can help you. The major signs of tire failure are:

Sound. The loud “bang” of a blowout is an easily recognized sign. Because it can take a few seconds for your vehicle to react, you might think it was something else.

Vibration. If the vehicle vibrates or jumps, it may be a sign that one of the tires has gone flat. With a rear tire, that may be the only sign you get.

Feel. If the steering feels “heavy,” it is probably a sign that one of the tires has failed. Sometimes, failure of a rear tire will cause the vehicle to slide back and forth or “fishtail.” However, dual rear tires usually prevent this.

Respond to Tire Failure. When a tire fails, your vehicle is in danger. You must immediately:

 Hold the Steering Wheel Firmly. If a front tire fails, it can twist the steering wheel out of your hand. The only way to prevent this is to keep a firm grip on the steering wheel with both hands at all times.

Stay Off the Brake. It’s natural to want to brake in an emergency. However, braking when a tire has failed could cause loss of control. Unless you’re about to run into something, stay off the brake until the vehicle has slowed down. Then brake very gently, pull off the road, and stop.

Check the Tires. After you’ve come to a stop, get out and check all the tires. Do this even if the vehicle seems to be handling all right. If one of your dual tires goes, the other may fail also. You may know it is by getting out and looking at it.

2.18 – Anti-lock Braking Systems (ABS)

ABS is a computerized system that keeps your wheels from locking up during hard braking. ABS does not decrease or increase your normal braking capability. ABS only activates when wheels are about to lock up.

ABS works faster than the driver can respond to potential wheel lockup. At all other times the brake system will operate normally.

2.18.1 – How Anti-lock Braking Systems Work

Sensors detect potential wheel lock up. An electronic control unit (ECU) will then decrease brake pressure to avoid wheel lockup.

Brake pressure is adjusted to provide the maximum braking without danger of lockup.

2.18.2 – Vehicles Required to Have Anti-lock Braking Systems

The Department of Transportation requires that ABS be on:

• Truck tractors with air brakes built on or after March 1, 1997.
• Other air brake vehicles, (trucks, buses, trailers, and converter dollies) built on or after March 1, 1998; and
• Hydraulically braked trucks and buses with a gross vehicle weight rating of 10,000 lbs or more built on or after March 1, 1999.

Many commercial vehicles built before these dates have been voluntarily equipped with ABS.

2.18.3 – How to Know If Your Vehicle Is Equipped with ABS

As a system check on newer vehicles, the malfunction lamp comes on at start-up for a bulb check, and then goes out quickly. On older systems, the lamp could stay on until you are driving over friction.

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be difficult to tell if the unit is equipped with ABS. Look under the vehicle for the ECU and wheel speed sensor wires coming from the back of the brakes.

2.18.4 - How ABS Helps You
When you brake hard on slippery surfaces in a vehicle without ABS, your wheels may lock up. When your steer-
ing wheels lock up, you lose steering control. When your other wheels lock up, you may skid, jackknife, or even spin the vehicle.

ABS helps you avoid wheel lock up and maintains control. You may or may not be able to stop faster with ABS, but you should be able to steer around an obstacle while braking, and avoid skids caused by over braking.

2.18.5 – ABS on the Tractor Only or Only on the Trailer
Having ABS on only the tractor, only the trailer, or even on only one axle, still gives you more control over the vehicle during braking. Brake normally.

When only the tractor has ABS, you should be able to maintain steering control, and there is less chance of jack-
knife. But keep your eye on the trailer and let up on the brakes (if you can safely do so) if it begins to swing out.

When only the trailer has ABS, the trailer is less likely to swing out, but if you lose steering control or start a trac-	or jackknife, let up on the brakes (if you can safely do so) until you regain control.

2.18.6 - Braking with ABS
When you drive a vehicle with ABS, you should brake as you always have. In other words:
- Use only the braking force necessary to stop safely and stay in control.
- Brake the same way, regardless of whether you have ABS on the bus, tractor, the trailer, or both.
- As you slow down, monitor your tractor and trailer and back off the brakes (if it is safe to do so) to stay in control.

There is only one exception to this procedure. If you drive a straight truck or combination with working ABS on all axles, in an emergency stop, you can fully apply the brakes.

2.18.7 – Braking If ABS Is Not Working
Without ABS you still have normal brake functions. Drive and brake as you always have.

Vehicles with ABS have yellow malfunction lamps to tell you if something isn’t working.

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2.18.8 – Safety Reminders
- ABS won’t allow you to drive faster, follow more closely, or drive less carefully.
- ABS won’t prevent power or turning skids – ABS should prevent brake-induced skids or jackknives, but not those caused by spinning the drive wheels or going too fast in a turn.
- ABS won’t necessarily shorten stopping distance. ABS will help maintain vehicle control, but not always shorten stopping distance;
- ABS won’t increase or decrease ultimate stopping power. ABS is an “add on” to your normal brakes, not a replacement for them;
- ABS won’t change the way you normally brake. Under normal brake conditions, your vehicle will stop as it always stopped. ABS only comes into play when a wheel would normally have locked up because of over braking;
- ABS won’t compensate for bad brakes or poor brake maintenance;
- Remember: The best vehicle safety feature is still a safe driver;
- Remember: Drive so you never need to use your ABS, and
- Remember: If you need it, ABS could help to prevent a serious crash.

2.19 – Skid Control and Recovery
A skid happens whenever the tires lose their grip on the road. This is caused in one of four ways:

Over-braking. Braking too hard and locking up the wheels. Skids also may occur when using the speed retarder when the road is slippery.

Over-steering. Turning the wheels more sharply than the vehicle can turn.

Over-acceleration. Supplying too much power to the drive wheels, causing them to spin.

Driving Too Fast. Most serious skids result from driving too fast for road conditions. Drivers who adjust their driv-
ing to conditions don’t over-accelerate and don’t have to over-brake or over-steer from too much speed.

2.19.1 – Drive-Wheel Skids
By far the most common skid is one in which the rear wheels lose traction through excessive braking or ac-
celeration. Skids caused by acceleration usually happen on ice or snow. Taking your foot off the accelerator can easily stop them. (If it is very slippery, push the clutch in.

Otherwise, the engine can keep the wheels from rolling freely and regaining traction.)

Rear wheel braking skids occur when the rear drive wheels lock. Because locked wheels have less traction than roll-
ing wheels, the rear wheels usually slide sideways in an attempt to “catch up” with the front wheels. In a bus or straight truck, the vehicle will slide sideways in a “spin out.” With vehicles towing trailers, a drive-wheel skid can let the trailer push the towing vehicle sideways, causing a sudden jackknife. See Figure 2.19.

2.19.2 – Correcting a Drive-Wheel Braking Skid
Do the following to correct a drive-wheel braking skid.

Stop Braking. This will let the rear wheels roll again, and keep the rear wheels from sliding.

Countersteer. As a vehicle turns back on course, it has a tendency to keep on turning. Unless you turn the steering wheel quickly the other way, you may find yourself skid-
ing in the opposite direction.

Learning to stay off the brake, turn the steering wheel quickly, push in the clutch, and countersteer in a skid takes a lot of practice. The best place to get this practice is on a large driving range or “skid pad.”

2.19.3 – Front-Wheel Skids
Driving too fast for conditions causes most front-wheel skids. Other causes include lack of tread on the front tires and cargo loaded so not enough weight is on the front axle. In a front-wheel skid, the front end tends to go in a straight line regardless of how much you turn the steering wheel. On a very slippery surface, you may not be able to steer around a curve or turn.

When a front-wheel skid occurs, the only way to stop the skid is to let the vehicle slow down. Stop turning and/or braking so hard. Slow down as quickly as possible without skidding.

2.20 – Crash Procedures
When you’re in a crash and not seriously hurt, you need to act to prevent further damage or injury. The basic steps to be taken at any crash are to:

Protect the area;

Notify authorities; and

Care for the injured.

2.20.1 – Protect the Area
The first thing to do at a crash scene is to keep another crash from happening in the same spot. To protect the crash area:

- If your vehicle is involved in the crash, try to get it to the side of the road. This will help prevent another crash and allow traffic to move.
- If you’re stopping to help, park away from the crash.
- The area immediately around the crash will be needed for emergency vehicles;

Put on your flashers;

If the lamp stays on after the bulb check, or goes on once you are under way, you may have lost ABS control on one or more wheels.

Remember, if your ABS malfunctions, you still have regular brakes. Drive normally, but get the vehicle serviced soon.

When only the tractor has ABS, the trailer is less likely to swing out, but if you lose steering control or start a trac-
tor jackknife, let up on the brakes (if you can safely do so) until you regain control.

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- If you’re stopping to help, park away from the crash.
- The area immediately around the crash will be needed for emergency vehicles;

Put on your flashers;
2.21 – Fires

**Fire Prevention**

Pay attention to the following:

- **Pre-Trip Inspection**: Make a complete inspection of the electrical, fuel, and exhaust systems, tires, and cargo. Be sure to check that the fire extinguisher is charged.
- **Eurolite Inspection**: Check the tires, wheels, and truck body for signs of heat whenever you stop during a trip.
- **Follow Safe Procedures**: Follow correct safety procedure involving the vehicle, using brakes, handling flares, and other activities that can cause a fire.
- **Monitoring**: Check the instruments and gauges often for signs of overheating and use the mirrors to look for signs of smoke from tires or the vehicle.
- **Caution**: Use normal caution in handling anything flammable.

2.21.3 – Fire Fighting

Knowing how to fight fires is important. Drivers who didn’t know what to do made fires worse. Know how the fire extinguisher works. Study the instructions printed on the extinguisher before you need it. Here are some procedures to follow in case of fire.

**Pull Off The Road.** The first step is to get the vehicle off the road and stop. In doing so:

- Park in an open area, away from buildings, trees, brush, other vehicles, or anything that might catch fire;
- Don’t pull into a service station;
- Notify emergency services of your problem and your location.

**Keep the Fire from Spreading.** Before trying to put out the fire, make sure that it doesn’t spread any further:

- With an engine fire, turn off the engine as soon as you can. Don’t open the hood if you can avoid it. Shoot foam through louvers, radiator, or from the vehicle’s underside;
- For a cargo fire in a van or box trailer, keep the doors shut, especially if your cargo contains hazardous materials. Opening the van doors will supply the fire with oxygen and can cause it to burn very fast.

**Extinguish the Fire.** Here are some rules to follow in putting out a fire:

- When using the extinguisher, stay as far away from the fire as possible;
- Aim at the source or base of the fire, not up in the flames.

**Use the Right Fire Extinguisher**

- Figures 2.20 and 2.21 detail the type of fire extinguisher to use by class of fire.
- The B:C type fire extinguisher is designed to work on electrical fires and burning liquids;
- The A:B:C type is designed to work on burning wood, paper, and cloth as well;
- Water can be used on wood, paper, or cloth, but don’t use water on an electrical fire (can cause shock) or a gasoline fire (it will spread the flames).

### Test Your Knowledge

**Subsections 2.20 & 2.21**

1. What are some things to do at a crash scene to prevent another crash?
2. Name two causes of fire fires.
3. What kinds of fires is a B:C extinguisher not good for?
4. When using your extinguisher, should you get as close as possible to the fire?
5. Name some causes of vehicle fires.

These questions may be on the test. If you can’t answer them all, review subsections 2.20 and 2.21.

### Class/Type of Fires

<table>
<thead>
<tr>
<th>Class/Type of Fire</th>
<th>Class</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Wood, Paper, Ordinary Combustibles</td>
<td>A or B</td>
<td>Water or Dry Chemicals</td>
</tr>
<tr>
<td>B Gasoline, Oil, Grease, Other Greasy Liquids</td>
<td>B or C</td>
<td>Carbon Dioxide or Dry Chemicals</td>
</tr>
<tr>
<td>C Electrical Equipment Fires</td>
<td>C</td>
<td>Carbon Dioxide (Dry)</td>
</tr>
<tr>
<td>D Fires in Combustible Metals</td>
<td>D</td>
<td>Special Extinguishing Powders</td>
</tr>
</tbody>
</table>

### Alcohol and Driving

- A burning tire must be cooled. Lots of water may be required;
- If you’re not sure what to use, especially on a hazardous materials fire, wait for firefighters;
- Position yourself upwind. Let the wind carry the ex-tinguisher to the fire;
- Continue until whatever was burning has been cooled. Absence of smoke or flame does not mean the fire cannot restart.

### Alcohol and Driving

**Drinking and Driving**

Drinking and then driving is very dangerous and a serious problem. People who drink alcohol are involved in traffic crashes resulting in over 20,000 deaths every year. Alcohol impairs muscle coordination, reaction time, depth perception, and night vision. It also affects the parts of the brain that control judgment and inhibition. For some people, one drink is all it takes to show signs of impairment.

### Blood Alcohol Concentration

**Blood Alcohol Concentration (BAC)**

- A standard drink contains the same amount of alcohol:
  - A 12-ounce glass of 5 percent beer;
  - A 5-ounce glass of 12 percent wine;
  - A 1 and 1/2-ounce shot of 80-proof liquor.

### Alcohol and the Brain

- Alcohol affects more and more of the brain as BAC builds up. The first part of the brain affected controls judgment and self-control. One of the bad things about this is it can keep drinkers from knowing they are getting drunk. And, of course, good judgment and self-control are absolutely necessary for safe driving.

As BAC continues to build up, muscle control, vision, and coordination are affected more and more. Effects on driving may include:

- Straddling lanes;
- Quick, jerky starts;
- Not signaling, failure to use lights;
- Running stop signs and red lights; and
- Improper passing.

### Crash Statistics

Crash statistics show that the chance of a crash is much greater for
Approximate Blood Alcohol Content

<table>
<thead>
<tr>
<th>Drinks</th>
<th>Body Weight in Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
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<tr>
<td></td>
<td>2</td>
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<tr>
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<td>3</td>
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<td>8</td>
</tr>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

Effects Of Increasing Blood Alcohol Content

Blood Alcohol Content is the amount of alcohol in your body recorded in milligrams per 100 milliliters of blood. Your BAC depends on the amount of blood (which increases with weight) and the amount of alcohol you consume over time (how fast you drink). The faster you drink, the higher your BAC, as the liver can only handle about one drink per hour—the rest builds up in your blood.

**Table:**

<table>
<thead>
<tr>
<th>BAC (g/dl)</th>
<th>Effects of Body</th>
<th>Effects on Driving Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>.02</td>
<td>Mellow feeling, slight body warmth</td>
<td>Less inhibited</td>
</tr>
<tr>
<td>.05</td>
<td>Noticeable relaxation</td>
<td>Less alert, less self-focused, coordination impairment begins</td>
</tr>
<tr>
<td>.08</td>
<td>Definite impairment in coordination &amp; judgment</td>
<td>Drunk driving limit, impaired coordination &amp; judgment</td>
</tr>
<tr>
<td>.10*</td>
<td>Noisy, possible embarrassing behavior, mood swings</td>
<td>Reduction in reaction time</td>
</tr>
<tr>
<td>.15</td>
<td>Impaired balance &amp; movement, clearly drunk</td>
<td>Unable to drive</td>
</tr>
<tr>
<td>.20</td>
<td>Many lose consciousness</td>
<td></td>
</tr>
<tr>
<td>.40</td>
<td>Most lose consciousness, some die</td>
<td></td>
</tr>
<tr>
<td>.50</td>
<td>Breathing stops, may die</td>
<td></td>
</tr>
</tbody>
</table>

**Definition:**

A BAC of .10 means that 1/10 of 1 percent (or 1/1000) of your total blood content is alcohol.

2.23 – Staying Alert and Fit to Drive

Driving a vehicle for long hours is tiring. Even the best of drivers will become less alert. However, there are things that good drivers do to help stay alert and safe.

2.23.1 – Be Ready to Drive

Get Enough Sleep. Sleep is not like money. You can’t save it up ahead of time and you can’t borrow it. But, just as with money, you can go into debt with it. If you don’t sleep enough, you “owe” more sleep to yourself. This debt can only be paid off by sleeping. You can’t overcome it with willpower, and it won’t go away by itself. The average person needs seven or eight hours of sleep every 24 hours. Leave on a long trip when you’re already tired is dangerous. If you have a long trip scheduled, make sure that you get enough sleep before you go.

Schedule Trips Safely. Try to arrange your schedule so you are not in “sleep debt” before a long trip. Your body gets used to sleeping during certain hours. If you are driving during those hours, you will be less alert. If possible, try to make your schedule for the hours you are normally awake. Many heavy motor vehicle crashes occur between midnight and 6 a.m. Tired drivers can easily fall asleep at these times, if found in time.

Recognize the Danger Signals of Drowsy Driving.

Driving a vehicle for long hours is tiring. Even the best of drivers will become less alert. However, there are things that good drivers do to help stay alert and safe. This could include a variety of prescription and over-the-counter drugs (cold medicines), which may make the driver drowsy or otherwise affect safe driving ability. However, possession and use of a drug given to a driver by a doctor is permitted if the doctor informs the driver that it will not affect safe driving ability.

Pay attention to warning labels for legitimate drugs and medicines, and to doctor’s orders regarding possible effects. Stay away from illegal drugs.

Don’t use any drug that hides fatigue — the only cure for fatigue is rest. Alcohol can make the effects of other drugs much worse. The safest rule is don’t mix drugs with driving at all.

Use of drugs can lead to traffic crashes resulting in death, injury, and property damage. Furthermore, it can lead to arrest, fines, and jail sentences. It can also mean the end of a person’s driving career.

2.23.2 – While You Are Driving Keep Cool.

A hot, poorly ventilated vehicle can make you sleepy. Keep the window or vent cracked open or use the air conditioner, if you have one.

Take Breaks. Short breaks can keep you alert. But the time to take them is before you feel really drowsy or tired. Stop often. Walk around and inspect your vehicle. It may help to do some physical exercises.

Be sure to take a mid-afternoon break and plan to sleep between midnight and 6 a.m.

2.23.3 – Drive When You Are Awake.

Sleep is not voluntary. If you’re drowsy, you can fall asleep and never even know it. If you are drowsy, you are likely to have “micro sleeps”—brief naps that last around four or five seconds. At 55 miles an hour, that’s more than 100 yards, and plenty of time for a crash. Even if you are not aware of being drowsy, if you have a sleep debt, you are still at risk.

Here are a few ways to tell if you’re about to fall asleep. If you experience any of these danger signs, take them as a warning that you could fall asleep without meaning to:

- Your eyes close or go out of focus by themselves.
- You have trouble keeping your head up.
- You don’t stop yawning.
- You have wandering, disconnected thoughts.
- You don’t remember driving the last few miles.
- You drift between lanes, tailgate, or miss traffic signs.
- You keep jerking the truck back into the lane; or
- You have drifted off the road and narrowly missed crashing.

If you have even one of these symptoms, you may be in danger of falling asleep. Pull off the road in a safe place and take a nap.
2.23.3 – When You Do Become Sleepy
When you are sleepy, trying to “push on” is far more dangerous than most drivers think. It is a major cause of fatal crashes. Here are some important rules to follow.

Stop to Sleep. When your body needs sleep, sleep is the only thing that will work. If you have to make a stop anyway, make it whenever you feel the first signs of sleepiness, even if it is earlier than you planned. By getting up a little earlier the next day, you can keep on schedule without the danger of driving while you are not alert.

Take a Nap. If you can’t stop for the night, at least pull off at a safe place, such as a rest area or truck stop, and take a nap. A nap as short as a half-hour will do more to overcome fatigue than a half-hour coffee stop.

Avoid Drugs. There are no drugs that can overcome being tired. While they may keep you awake for a while, they won’t make you alert. And eventually, you’ll be even more tired than if you hadn’t taken them at all. Sleep is the only thing that can overcome fatigue.

Do Not. Do not rely on coffee or another source of caffeine to keep you awake. Do not count on the radio, an open window, or other tricks to keep you awake.

2.23.4 – Illness
Once in a while, you may become so ill that you cannot operate a motor vehicle safely. If this happens to you, you must not drive. However, in case of an emergency, you may drive to the nearest place where you can safely stop.

2.24 – Hazardous Materials Rules For All Commercial Drivers
All drivers should know something about hazardous materials. You must be able to recognize hazardous cargo, and you must know whether or not you can haul it without a hazardous materials endorsement. To get the required endorsement, you must have a commercial driver license with the hazardous materials endorsement. See Figure 2.25.

2.24.1 – What Are Hazardous Materials?
Hazardous materials are products that pose a risk to health, safety, and property during transportation. See Figure 2.24.

2.24.2 – Why Are There Rules?
You must follow the many rules about transporting hazardous materials. The intent of the rules is to:

• Contain the product,
• Communicate the risk; and
• Ensure safe drivers and equipment.

To Contain the Product. Many hazardous products can injure or kill on contact. To protect drivers and others from contact, the rules tell shippers how to package safely. Similar rules tell drivers how to load, transport, and unload bulk tanks. These are containment rules.

2.24.3 – Lists of Regulated Products
Placards are used to warn others of hazardous materials. Placards are signs put on the outside of a vehicle that identify the hazard class of the cargo. A placarded vehicle must have at least four identical placards. They are put on the front, rear, and both sides. Placards must be readable from all four directions. They are at least 10 3/4 inches square, turned upright on a point, in a diamond shape. Cargo tanks and other bulk packaging display the identification number of their contents on placards or orange panels.

Identification Numbers are a four digit code used by first responders to identify hazardous materials. An identification number may be used to identify more than one chemical on shipping papers. The identification number will be preceded by the letters “NA” or “UN.” The US DOT Emergency Response Guidebook (ERG) identifies the chemicals all identification numbers are assigned to.

Not all vehicles carrying hazardous materials need to have placards. The rules about placards are given in Section 9 of this manual. You can drive a vehicle that carries hazardous materials if it does not require placards. If it requires placards, you cannot drive it unless your driver license has the hazardous materials endorsement. See Figure 2.25.

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 further. It will cost you time and money. A failure to placard when needed may risk your life and others if you have a crash. 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.

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**None** ORM-D (Other Regulated Material-Domestic) Hair Spray or Charcoal

**None** Combustible Liquids Fuel Oil, Lighter Fluid

**Subsections 2.22, 2.23 & 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 driner 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.

Figure 2.24
To Communicate the Risk. The shipper uses a shipping paper and diamond-shaped hazard labels to warn dockworkers and drivers of the risk.

Figure 2.25
The rules require all drivers of placarded vehicles to learn how to safely load and transport hazardous products. They must have a commercial driver license with the hazardous materials endorsement. To get the required endorsement, you must pass a written test on material found in Section 9 of this manual. 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 your vehicle has a permanently mounted cargo tank of any capacity, or your vehicle is carrying a portable tank with a capacity of 1,000 gallons or more.
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; and
- 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 5 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 three hours or 150 miles; and
- 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 follow-
ing are some definitions of weight you should know:

3.2.1 – Definitions You Should Know:
- Gross Vehicle Weight (GVW) is 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 Capacity has a manufacturer’s weight capacity rating, and
- Coupling Device Capacity 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 overload-
ing 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 impor-
tant 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

Page 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. Blocking 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.

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 is, there should be at least two tiedowns holding it.

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 interfere with your ability to see.

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3.3.5 – Sealed and Containerized Loads
Containerized loads generally are used when freight is to 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 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.

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.
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 semi-trailer);
- Parking brake;
- Steering mechanism;
- Lights and reflectors;
- Tires (front wheels must not have recapped or re-grooved tires);
- Horn;
- Windshield wiper or wipers;
- Rear-view mirror or mirrors;
- Coupling devices (if present);
- Wheels and rims; and
- Emergency equipment.

4.1.2 – Access Doors and Panels

As you check the outside of the bus, close any open access panels (for baggage, restroom service, engine, etc.) before driving.

4.2 – Loading and Trip Start

Do not allow riders to leave carry-on baggage in a doorway or aisle. There should be nothing in the aisle that might trip other riders. Secure baggage and freight in ways that avoid damage and:
- Allow the driver to move freely and easily;
- Allow riders to exit by any window or door in an emergency; and
- Protect riders from injury if carry-ons fall or shift.

4.2.1 – Hazardous Materials

Watch for cargo or baggage containing hazardous materials. Most hazardous materials cannot be carried on a bus.

The Federal Hazardous Materials Table shows which materials are hazardous. They pose a risk to health, safety, and property during transportation. The rules require shippers to mark containers of hazardous material with the material’s name, identification number, and hazard label. There are nine different four-inch, diamond-shaped hazard labels. See Figure 4.1. Watch for the diamond-shaped labels. Do not transport any hazardous material unless you are sure the rules allow it.
4.2 – At Your Destination
When arriving at the destination or intermediate stops announce:
- The location;
- Reason for stopping;
- Next departure time; and
- Bus number.

Remind riders to take carry-ons with them if they get off the bus. If the aisle is on a lower level than the seats, remind riders of the step-down. It is best to tell them before coming to a complete stop.

Charter bus drivers should not allow riders on the bus until departure time. This will help prevent theft or vandalism of the bus.

4.3 – On the Road
4.3.1 – Passenger Supervision
Many charter and intercity carriers have passenger comfort and safety rules. Mention rules about smoking, drinking, or use of radio and tape players at the start of the trip. Explaining the rules at the start will help to avoid trouble later on.

While driving, scan the interior of your bus as well as the road ahead, to the sides, and to the rear. You may have to remind riders about rules, or to keep arms and heads inside the bus.

4.3.2 – At Stops
Riders can stumble when getting on or off, and when the bus starts or stops. Caution riders to watch their step when leaving the bus. Wait for them to sit down or brace themselves before starting. Start and stopping should be as smooth as possible to avoid rider injury.

Occasionally, you may have a drunk or disruptive rider. You must ensure this rider's safety as well as that of others. Don't discharge such riders where it would be unsafe for them. It may be safer at the next scheduled stop or a well-lit area where there are other people. Many carriers have guidelines for handling disruptive riders.

4.3.3 – Common Crashes
The Most Common Bus Crashes. Bus crashes often happen at intersections. Use caution, even if a signal or stop sign controls other traffic. School and mass transit buses sometimes scrape off mirrors or hit passing vehicles when pulling out from a bus stop. Remember the clearance of the bus, and watch for poles and tree limbs at stops. Know the size of the gap your bus needs to accelerate and merge with traffic. Wait for the gap to open before leaving the stop. Never assume other drivers will brake to give you room when you signal or start to pull out.

4.3.4 – Speed on Curves
Crashes on curves that kill people and destroy buses result in a breakdown. If there are no defects, the report should say so.

4.3.5 – Railroad-highway Crossings Stops
Stop at RR Crossings; 
- Stop your bus between 15 and 50 feet before railroad crossings; 
- Listen and look in both directions for trains. You should open your forward door if it improves your ability to see or hear an approaching train; 
- Before crossing after a train has passed, make sure there isn't another train coming in the other direction on other tracks; 
- If your bus has a manual transmission, never change gears while crossing the tracks; 
- You do not have to stop, but must slow down and carefully check for other vehicles:
  - At street crossings; 
  - Where a policeman or flagman is directing traffic; 
  - If a traffic signal is green; and 
  - At crossings marked as "exempt" or "abandoned."

4.4 – Drawbridges
Stop at Drawbridges. Stop at drawbridges that do not have a signal light or traffic control attendant. Stop at least 50 feet before the draw of the bridge. Look to make sure the draw is completely closed before crossing. You do not need to stop, but must slow down and make sure it's safe, when:
- There is a traffic light showing green, and 
- The bridge has an attendant or traffic officer who controls traffic whenever the bridge opens.

4.5 – Prohibited Practices
Avoid feeding your bus with riders on board unless absolutely necessary. Never refill in a closed building with riders on board.

Do not tow or push a disabled bus with riders aboard the vehicle, unless giving off would be unsafe. Only tow or push the bus to the nearest safe spot to discharge passengers. Follow your employer's guidelines on towing or pushing disabled busses.

4.6 – Use of Brake-door Interlocks
Urban mass transit coaches may have a brake and accelerator interlock system. The interlock applies the brakes and holds the throttle in idle position when the rear door is open. The interlock releases when you close the rear door. Do not use this safety feature in place of the parking brake.

Section 4 — Test Your Knowledge
1. Name some things to check in the interior of a bus during a pre-trip inspection. 
2. What are some hazardous materials you can transport by bus? 
3. What are some hazardous materials you can’t transport by bus? 
4. What is a standee line? 
5. Does it matter where you make a disruptive passenger get off the bus? 
6. How far from a railroad crossing should you stop? 
7. When must you stop before crossing a drawbridge? 
8. Describe from memory the “prohibited practices” listed in the manual. 
9. The rear door of a transit bus has to be open to put on the parking brake. True or False? These questions may be on your test. If you can’t answer them all, reread Section 4.

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Figure 4.1

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Section 4 — Transporting Passengers Safely
Section 5

AIR BRAKES

This Section Covers

- Air Brake System Parts
- Dual Air Brake Systems
- Inspecting Air Brakes
- Using Air Brakes

This section tells you about air brakes. If you want to drive a truck or bus with air brakes, or pull a trailer with air brakes, you need to read this section. If you want to pull a trailer with air brakes, you also need to read Section 6, Combination Vehicles. An air brake endorsement is only required if your vehicle needs a CDL.

Air brakes use compressed air to make the brakes work. Air brakes are a good and safe way of stopping large and heavy vehicles, but the brakes must be well maintained and used properly.

Air brakes are really three different braking systems: service brake, parking brake, and emergency brake.

- The service brake system applies and releases the brakes when you use the brake pedal during normal driving;
- The parking brake system applies and releases the parking brakes when you use the parking brake control;
- The emergency brake system uses parts of the service and parking brake systems to stop the vehicle in a brake system failure.

The parts of these systems are discussed in greater detail below.

5.1 – The Parts of an Air Brake System

There are many parts to an air brake system. You should know about the parts discussed here.

5.1.1 – Air Compressor

The air compressor pumps air into the air storage tanks (reservoirs). The air compressor is connected to the engine through gears or a v-belt. The compressor may be air cooled or may be cooled by the engine cooling system. It may have its own oil supply or be lubricated by engine oil. If the compressor has its own oil supply, check the oil level before driving.

5.1.2 – Air Compressor Governor

The governor controls when the air compressor will pump air into the air storage tanks. When air tank pressure rises to the “cut-out” level (around 125 pounds per-square-inch or “psi”), the governor stops the compressor from pumping air. When the tank pressure falls to the “cut-in” pressure (around 100 psi), the governor allows the compressor to start pumping again.

5.1.3 – Air Storage Tanks

Air storage tanks are used to hold compressed air. The number and size of air tanks varies among vehicles. The tanks will hold enough air to allow the brakes to be used several times, even if the compressor stops working.

5.1.4 – Air Tank Drains

Compressed air usually has some water and some compressor oil in it, which is bad for the air brake system. For example, the water can freeze in cold weather and cause brake failure. The water and oil tend to collect in the bottom of the air tank. Be sure that you drain the air tanks completely. Each air tank is equipped with a drain valve in the bottom. There are two types:

- Manually operated by turning a quarter turn or by pulling a cable. You must drain the tanks yourself at the end of each day of driving. See Figure 5.1; and
- Automatic — the water and oil are automatically expelled. These tanks may be equipped for manual draining as well.

Automatic air tanks are available with electric heating devices. These help prevent freezing of the automatic drain in cold weather.

5.1.5 – Alcohol Evaporator

Some air brake systems have an alcohol evaporator to put alcohol into the air system. This helps to reduce the risk of ice in air brake valves and other parts during cold weather. Ice inside the system can make the brakes stop working.

Check the alcohol container and fill up as necessary, every day during cold weather. Daily air tank drainage is still needed to get rid of water and oil, unless the system has automatic drain valves.
5.1.6 – Safety Valve
A safety relief valve is installed in the first tank the air compressor pumps air to. The safety valve protects the tank from a system explosion. If the system air pressure builds too much pressure, the valve will open, letting out the excess air.

5.1.7 – The Brake Pedal
You put on the brakes by pushing down the brake pedal. (It is also called the foot valve or t阅读 valve.) Pushing the pedal downward applies more air pressure. Letting up on the brake pedal reduces the air pressure and releases the brakes. Releasing the brakes lets some compressed air get out of the system, so the air pressure in the tank is reduced. It must be made up by the air compressor. Pressing and releasing the pedal unnecessarily can let air out faster than the compressor can replace it. If the pressure gets too low, the brakes won’t work.

5.1.8 – Foundation Brakes
Foundation brakes are used at each wheel. The most common type is the s-cam drum brake. The parts of the brake are discussed below.

Brake Drums, Shoes, and Linings. Brake drums are located on each end of the vehicle’s axles. The wheels are bolted to the drums. The braking mechanism is inside the drum. To stop, the brake shoes and linings are pushed against the inside of the drum. This causes friction, which slows the vehicle (and creates heat). The heat a drum can take without damage depends on how hard and how long the brakes are used. Too much heat can make the brake stop working.

S-cam Brakes. When you push the brake pedal, air is let into each brake chamber. Air pressure pushes the rod or “plunger” against the s-cam, which is attached to the brake shoe camshaft. This turns the s-cam (so called because it is shaped like the letter “S”). The s-cam forces the brake shoes away from the drum, pressing them against the inside of the brake drum. When you release the brake pedal, the s-cam rotates back and a spring pulls the brake shoes away from the drum, letting the wheels roll freely again. See Figure 5.2.

Wedge Brakes. In this type of brake, the brake chamber push rod pushes a wedge directly between the ends of two brake shoes. This causes them to separate and against the inside of the brake drum. Wedge brakes may have a single brake chamber, or two brake chambers, pushing wedges in at both ends of the brake shoes. Wedge-type brakes may be self-adjusting or may require manual adjustment.

Drum Brake

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<th>Diagram Elements</th>
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<tr>
<td>Drum Brake</td>
<td>A large, rotating section of the brake assembly.</td>
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<td>Bridge Drum</td>
<td>A section of the brake assembly between the wheels.</td>
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<tr>
<td>Brake Chamber</td>
<td>A section of the brake assembly that holds the brake linings.</td>
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<tr>
<td>Slack Adjuster</td>
<td>A device that adjusts the brake shoes to ensure proper contact with the drum.</td>
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<tr>
<td>Adjusting Nut</td>
<td>A component that holds the brake shoes in place.</td>
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<tr>
<td>Brake Cam</td>
<td>A section of the brake assembly that connects the brake shoes to the brake drum.</td>
</tr>
<tr>
<td>Cam Roller</td>
<td>A component that allows the brake shoes to move freely.</td>
</tr>
<tr>
<td>Brake Shoe</td>
<td>A section of the brake assembly that comes into contact with the drum.</td>
</tr>
<tr>
<td>Lining</td>
<td>A component that provides friction against the drum.</td>
</tr>
</tbody>
</table>

Figure 5.2

5.1.9 – Supply Pressure Gauges
All vehicles with air brakes have pressure gauge connected to the air tank. If the vehicle has a dual air brake system, there will be a gauge for each half of the system, or a single gauge with two needles. Dual systems will be discussed later. These gauges tell you how much pressure is in the air tanks.

5.1.10 – Application Pressure Gauge
This gauge shows how much air pressure you are applying to the brakes. (This gauge is not on all vehicles.) Increasing application pressure to hold the brake speed means the brakes are fading. You should slow down and use a lower gear. The need for increased pressure can also be caused by brakes out of adjustment, air leaks, or mechanical problems.

5.1.11 – Low Air Pressure Warning
A low air pressure warning signal is required on vehicles with air brakes. A warning signal you can see must come on before the air pressure in the tanks falls below 60 psi, or one half the compressor governor cutout pressure on older vehicles. The warning is usually a red light. A buzzer may also come on.

Another type of warning is the “wig-wag” device that drops a mechanical arm into your view when the pressure in the system drops below 60 psi. An automatic wig-wag will rise out of your view when the pressure in the system goes above 60 psi. The manual reset type must be placed in the “out of view” position manually. It will not stay in place until the pressure in the system is above 60 psi.

On large buses it is common for the low pressure warning devices to signal at 80–85 psi.

5.1.12 – Stop Light Switch
Drivers behind you must be warned when you put your brakes on. The air brake system does this with an electric switch that works by air pressure. The switch turns on when the brake lights when you put on the air brakes.

5.1.13 – Front Brake Limiting Valve
Some older vehicles (made before 1975) have a front brake limiting valve and a control in the cab. The control is usually marked “normal” and “slippery.” When you push the control in the “slippery” position, the limiting valve cuts the “normal” air pressure to the front brakes by half. Limiting valves were used to reduce the chance of the front wheels skidding on slippery surfaces. However, they actually reduce the stopping power of the vehicle. Front wheel braking is good under all conditions. Tests have shown front wheel skids from braking are not likely even on ice. Make sure the control is in the “normal” position to have normal stopping power.

Many vehicles have automatic front wheel limiting valves. They reduce the air to the front brakes except when the brakes are on for very hard (60 psi or more application pressure). These valves cannot be controlled by the driver.

5.1.14 – Spring Brakes
All trucks, trucks, and buses must be equipped with emergency brakes and parking brakes. They must be held on by mechanical force (because air pressure can evolve). Spring brakes are usually used to meet these needs. When driving, powerful springs are held back by air pressure. If the air pressure is removed, the springs put the brakes on. A parking brake control in the cab allows the driver to let the air out of the spring brakes. This lets the springs put the brakes on. A leak in the air brake system, which causes all the air to be lost, will also cause the springs to put the brakes on.

Tractor and straight truck spring brakes will come fully on when air pressure drops to a range of 20 to 45 psi (typically 20 to 30 psi). Do not wait for the brakes to come on automatically. When the low air pressure warning light and buzzer first come on, bring the vehicle to a safe stop right away, while you can still control the brakes.

The braking power of spring brakes depends on the brake being in adjustment. If the brakes are not adjusted properly, neither the regular brakes nor the emergency/parking brakes will work right.

5.1.15 – Parking Brake Controls
In newer vehicles with air brakes, you put on the parking brakes using a diamond-shaped, yellow, push-pull control that is bolted to the parking brakes (spring brakes) on, and push it in to release them. On older vehicles, the parking brakes may be controlled by a lever. Use the parking brakes whenever you park.

Caution. Never push the brake pedal down when the spring brakes are on. If you do, the brakes could be damaged by the combined forces of the springs and the air pressure. Many brake systems are designed so this will not happen. But not all systems are set up that way, and those that are may not always work. It is much better to develop the habit of not pushing the brake pedal down when the spring brakes are on.

Modulating Control Valves. In some vehicles a control handle on the dash board may be used to apply the spring brakes gradually. This is called a modulating valve. If it is spring-loaded you have a feel for the braking action. The more you move the control lever, the harder the spring brakes come on. They work this way so you can control the spring brakes if the service brakes fail. When parking a vehicle with a modulating control valve, move the lever as far as it will go and hold it in place with the locking device.

Dual Parking Control Valves. When main air pressure is lost, the spring brakes come on. Some vehicles, such as buses, have a separate air tank for parking brakes. The other brake system is used to release the spring brakes. This is so you can move the vehicle in an emergency. One of the valves is a pull-push type and is used to apply the spring brakes. The other is spring loaded in the “out” position. When you push the control in, air from the separate air tank releases the spring brakes so you can move. When you release the button, the spring brakes come on again. There is only enough air in the separate tank to do this a few times. Therefore, plan carefully when moving. Otherwise, you may be launched in a dangerous location when the separate air supply runs out. See Figure 5.3.

5.1.16 – Anti-lock Braking Systems (ABS)
Truck tractors with air brakes built on or after March 1, 1997, and other air brakes vehicles, (trucks, buses, trailers, and converter dollies) built on or after March 1, 1998, are required to be equipped with anti-lock brakes. Many commercial vehicles have an anti-lock brake system that are voluntarily equipped with ABS. Check the certification label for the date of manufacture to determine if your vehicle is equipped with ABS. An ABS-equipped system that keeps your wheels from locking up during hard brake applications.

Vehicles with ABS have yellow malfunction lamps to tell you if something isn’t working.

Tractors, trucks, and buses will have yellow ABS malfunction lamps on the instrument panel.
Tractors will have yellow ABS malfunction lamps on the left side, either on the front or rear corner. Dollies manufactured on or after March 1, 1998 are required to have a lamp on the left side.

ABS is an addition to your normal brakes. It does not decrease or increase your normal braking capability. ABS only activates when wheels are about to lock up. ABS does not necessarily shorten your stopping distance, but it does help you keep the vehicle under control during hard braking.

**Subsection 5.1 Test Your Knowledge**

1. Why must air tanks be drained?
2. What is a supply pressure gauge used for?
3. All vehicles with air brakes must have a low air pressure warning signal. True or False?
4. What are spring brakes?
5. Front wheel brakes are good under all conditions. True or False?
6. How do you know if your vehicle is equipped with anti-lock brakes?

These questions may be on your test. If you can’t answer them all, reread subsection 5.1.

### 5.2 – Dual Air Brake

Most heavy-duty vehicles use dual air brake systems for safety. A dual air brake system has two separate air brake systems, which use a single set of brake controls. Each system has its own air tanks, hoses, lines, etc. One system typically operates the regular brakes on the rear axle or axles. The other system operates the regular brakes on the front axle (and possibly one rear axle). Both systems supply air to the trailer (if there is one). The first system is called the “primary” system. The other is called the “secondary” system. See Figure 5.4.

Before driving a vehicle with a dual air system, allow time for the air compressor to build up a minimum of 100 psi pressure in both the primary and secondary systems. Watch the primary and secondary air pressure gauges (or needles, if the system has two needles in one gauge). Pay attention to the low air pressure warning light and buzzer. The warning light and buzzer should shut off when air pressure in both systems rises to a value set by the manufacturer. This value must be greater than 60 psi.

The warning light and buzzer should come on before the air pressure drops below 60 psi in either system. If this happens while driving, you should stop right away and safely park the vehicle. If one air system is very low on pressure, either the front or the rear brakes will not be operating fully. This means it will take you longer to stop. Bring the vehicle to a safe stop, and have the air brakes system fixed.

### 5.3 – Inspecting Air Brake Systems

You should use the basic seven-step inspection procedure described in Section 2 to inspect your vehicle. There are more things to inspect on a vehicle with air brakes than one without them. These things are discussed below, in the order they fit into the seven-step method.

#### 5.3.1 – During Step 2 Engine Compartment Checks

Check Air Compressor Drive Belt (if compressor is belt-driven). If the air compressor is belt-driven, check the condition and tightness of the belt. It should be in good condition.

#### 5.3.2 – During Step 5 Walkaround Inspection

Check Slack Adjusters on S-cam Brakes. Park on level ground and chock the wheels to prevent the vehicle from moving. Release the parking brakes so you can move the slack adjusters. Use gloves and pull hard on each slack adjuster that you can reach. If a slack adjuster moves more than about one inch where the push rod attaches to it, it probably needs adjustment. Adjust it or have it adjusted. Vehicles with too much brake slack can be very hard to stop. Out-of-adjustment brakes are the most common problem found in roadside inspections. Be safe. Check the slack adjusters.

All vehicles built since 1994 have automatic slack adjusters. Even though automatic slack adjusters adjust themselves during full brake applications, they must be checked. Automatic adjusters should not have to be manually adjusted except when performing maintenance on the brakes and during installation of the slack adjusters. In a vehicle equipped with automatic adjusters, when the pushrod stroke exceeds the legal brake adjustment limit, it is an indication that a mechanical problem exists in the adjuster itself, a problem with the related foundation brake components, or that the adjuster was improperly installed. The manual adjustment of an automatic adjuster to bring a brake pushrod stroke within legal limits is generally masking a mechanical problem and is not fixing it. Further, routine adjustment of most automatic adjusters will likely result in premature wear of the adjuster itself. It is recommended that when brakes equipped with automatic adjusters are found to be out of adjustment, the driver take the vehicle to a repair facility as soon as possible to have the problem corrected.
The manual adjustment of automatic slack adjusters is dangerous because it gives the vehicle operator a false sense of security about the effectiveness of the braking system. It should only be used as a temporary measure to correct the adjustment in an emergency situation as it likely the brake will soon be back out of adjustment since this procedure usually does not fix the underlying adjustment problem.

Check Brake Drums (or Discs), Linings, and Hoses. Brake drums (or discs) must not have cracks longer than one half the width of the friction area. Linings (friction material) must not be loose or soaked with oil or grease. They must not be dangerously thin. Mechanical parts must be in place, not broken or missing. Check the air hoses connected to the brake chambers to make sure they aren’t cut or worn due to rubbing.

Test Low Pressure Warning Signal. Shut the engine off when you have enough air pressure so that the low pressure warning signal is not on. Turn the electrical power on and step on and off the brake pedal to reduce air tank pressure. The low air pressure warning signal must come on beeps if the pressure drops to less than 60 psi in the air tank (or tank with the lowest air pressure, in dual air systems). See Figure 5.5.

Check That Spring Brakes Come On Automatically. Continue to fan off the air pressure by stepping on and off the brake pedal to reduce tank pressure. The air governor should cut-out the air compressor start at about 100 psi and stop at about 125 psi. (Check manufacturer’s specifications.) Run the engine at a fast idle. The air governor should cut-out the air compressor at about the manufacturer’s specified pressure. The air pressure shown by your gauge(s) will stop rising. With

If air pressure does not build up fast enough, your pressure may drop too low during driving, requiring an emergency stop. Don’t drive until you get the problem fixed.

Test Air Leakage Rate. With a fully charged air system (typically 125 psi), turn off the engine, release the parking brake, and time the air pressure drop. The loss rate should be less than two psi in one minute for single vehicles and less than three psi in one minute for combination vehicles. Then apply 90 psi or more with the brake pedal. After the initial pressure drop, if the air pressure falls more than three psi in one minute for single vehicles (more than four psi for combination vehicles), the air loss rate is too high. Check for leaks and fix before driving the vehicle. Otherwise, you could lose your brakes while driving.

Check Air Compressor Governor Cut-in and Cut-out Pressures. Pumping by the air compressor should start at about 100 psi and stop at about 125 psi. (Check manufacturer’s specifications.) Run the engine at a fast idle. The air governor should cut-out the air compressor at about the manufacturer’s specified pressure. The air pressure shown by your gauge(s) will stop rising. With

The engine idling, step on and off the brake to reduce the air tank pressure. The compressor should cut-in at about the manufacturer’s specified cut-in pressure. The pressure should begin to rise.

If the air governor does not work as described above, it may need to be fixed. A governor that does not work properly may not keep enough air pressure for safe driving.

Test Parking Brake. Stop the vehicle, put the parking brake on, and gently pull against it in a low gear to test that the parking brake will hold.

Test Service Brakes. Wait for normal air pressure, release the parking brake, move the vehicle forward slowly (about five mph), and apply the brakes firmly using the brake pedal. Note any vehicle “pulling” to one side, unusual feel, or delayed stopping action. This test may show you problems, which you otherwise wouldn’t know about until you needed the brakes on the road.

Low Air Pressure Warning Devices

Subsections 5.2 and 5.3 Test Your Knowledge
1. What is a dual air brake system?
2. What are the slack adjusters?
3. How can you check slack adjusters?
4. How can you test the low pressure warning signal?
5. How can you check that the spring brakes come on automatically?
6. What are the maximum leakage rates?

These questions may be on your test. If you can’t answer them all, reread subsections 5.2 and 5.3.

5.4 – Using Air Brakes

5.4.1 – Normal Stops
Push the brake pedal down. Control the pressure so the vehicle comes to a smooth, safe stop. If you have a manual transmission, don’t push the clutch in until the engine rpm is down close to idle. When stopped, select a starting gear.

5.4.2 – Braking with Anti-lock Brakes
When you brake hard on slippery surfaces in a vehicle without ABS, your wheels may lock up. When your steering wheels lock up, you lose steering control. When your other wheels lock up, you may skid, jackknife, or even spin the vehicle.

ABS helps you avoid wheel lock-up. The computer senses impending lock-up, reduces the braking pressure to a safe level, and you maintain control.

5.4.3 – Emergency Stops
If somebody suddenly pulls out in front of you, your natural response is to hit the brakes. This is a good response if there’s enough distance to stop, and you use the brakes correctly.

You should brake in a way that will keep your vehicle in a straight line and allow you to turn if it becomes necessary. You can use the “controlled braking” method or the “stab braking” method.

Controlled Braking. With this method, you apply the brakes as hard as you can without locking the wheels. Keep steering wheel movements very small while doing this. If you need to make a larger steering adjustment or if the wheels lock, release the brakes. Re-apply the brakes as soon as you can.

Stab Braking
Apply your brakes all the way;
Release brakes when wheels lock up;
As soon as the wheels start rolling, apply the brakes fully again. (It can take up to one second for the wheels to lock up.)

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Section 5 — Air Brakes

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to start rolling after you release the brakes. If you re-
apply the brakes before the wheels start rolling, the
vehicle won't straighten out.

5.4.4 - Stopping Distance

Stopping distance was described in Section 2 under “Speed
and Stopping Distance.” With air brakes there is an added
delay—the time required for the brakes to work after the
brake pedal is pushed. With hydraulic brakes (used on
cars and light/medium trucks), the brakes work instantly.
However, with air brakes, it takes a little time (one-half
second or more) for the air to flow through the lines
to the brakes. Thus, the total stopping distance for
vehicles with air brake systems is made up of four dif-
f erent factors.

1. Perception Distance
2. Reaction Distance
3. Brake Lag Distance + Effective Braking Distance
4. Total Stopping Distance

The air brake lag distance at 55 mph on dry pavement adds
about 32 feet. So at 55 mph, for an average driver under
good traction and brake conditions, the total stopping
distance is over 450 feet. See Figure 5.6.

<table>
<thead>
<tr>
<th>Miles Per Hour</th>
<th>How Far the Rig Will Travel in One Second</th>
<th>Driver Reaction Distance</th>
<th>Vehicle Braking Distance</th>
<th>Total Stopping Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mph</td>
<td>22 ft.</td>
<td>17 ft.</td>
<td>29 ft.</td>
<td>66 ft.</td>
</tr>
<tr>
<td>30 mph</td>
<td>44 ft.</td>
<td>33 ft.</td>
<td>115 ft.</td>
<td>148 ft.</td>
</tr>
<tr>
<td>45 mph</td>
<td>66 ft.</td>
<td>45 ft.</td>
<td>110 ft.</td>
<td>221 ft.</td>
</tr>
<tr>
<td>50 mph</td>
<td>73 ft.</td>
<td>25 ft.</td>
<td>130 ft.</td>
<td>228 ft.</td>
</tr>
<tr>
<td>55 mph</td>
<td>81 ft.</td>
<td>40 ft.</td>
<td>190 ft.</td>
<td>251 ft.</td>
</tr>
</tbody>
</table>

Figure 5.6

5.4.5 - Brake Fading or Failure

Brakes are designed so brake shoes or pads rub against
the brake drum or discs to slow the vehicle. Braking creates
heat, but brakes are designed to take a lot of heat. How-
ever, brakes can fade or fail from excessive heat caused
by using them too much and not relying on the engine
braking effect.

Excessive use of the service brakes results in overheating
and leads to brake fade. Brake fade results from excessive
heat causing chemical changes in the brake lining, which
reduce friction, and also causing expansion of the brake
drums. As the overheated drums expand, the brake shoes
and linings have to move farther to contact the drums, and
the force of this contact is reduced. Continued overuse
may increase brake fade until the vehicle cannot be slowed
down or stopped.

Brake fade is also affected by adjustment. To safely control
a vehicle, every brake must do its share of the work. Brakes
out of adjustment will stop doing their share before those
that are in adjustment. The other brakes can then overheat
and fade, and there will not be enough braking available
to control the vehicle(s). Brakes can get out of adjustment
quickly, especially when they are hot. Therefore, check
brake adjustment often.

5.4.6 - Proper Braking Technique

Remember, the use of brakes on a long and/ or steep
downgrade is only a supplement to the braking effect of
the engine. Once the vehicle is in the proper low gear, the
following is the proper braking technique:

1. Apply the brakes just hard enough to feel a definite
   slowdown.
2. When your speed has been reduced to approximately
   five mph below your “safe” speed, release the brakes
   (This application should last for about three seconds.).
3. When your speed has increased to your “safe” speed,
   repeat steps 1 and 2.

For example, if your “safe” speed is 40 mph, you would
not apply the brakes until your speed reaches 40 mph.
Now apply the brakes hard enough to gradually reduce
your speed to 35 mph and then release the brake. Repeat
this as often as necessary until you have reached the end
of the downgrade.

5.4.7 - Low Air Pressure

If the low air pressure warning comes on, stop and safely
park your vehicle as soon as possible. There might be an
air leak in the system. Controlled braking is possible only
while enough air remains in the air tanks. The spring
brakes will come on when the air pressure drops into the
range of 20 to 45 psi. A heavily loaded vehicle will take a
long distance to stop because the spring brakes do not
work on all axles. Lightly loaded vehicles or vehicles on
slippery roads may skid out of control when the spring
brakes come on. It is much safer to stop while there is
enough air in the tanks to use the foot brakes.

5.4.8 - Parking Brakes

Anytime you park, use the parking brakes, except as noted
below. Pull the parking brake control knob out to apply
the parking brakes, push it in to release. The control will be a
yellow, diamond-shaped knob labeled “parking brakes” on
newer vehicles. On older vehicles, it may be a round blue
knob or some other shape (including a lever that swings
from side to side or up and down).

Don’t use the parking brakes if the brakes are very hot
(from just having come down a steep grade), or if the
brakes are very wet in freezing temperatures. If they are
used while they are very hot, they can be damaged by the
heat. If they are used in freezing temperatures when the
brakes are very wet, they can freeze so the vehicle cannot
move. Use wheel chocks on a level surface to hold the ve-

cicle. Let hot brakes cool before using the parking brakes.
If the brakes are wet, use the brakes lightly while driving
in a low gear to heat and dry them.

If your vehicle does not have automatic air tank drains,
drain your air tanks at the end of each working day
to remove moisture and oil. Otherwise, the brakes
could fail.

Never leave your vehicle unattended without apply-
ing the parking brakes or chocking the wheels. Your
vehicle might roll away and cause injury and damage.

Subsection 5.4

Test Your Knowledge

1. What should you do in the proper gear before
   starting down a hill?
2. What factors can cause brakes to fade or fail?
3. The use of brakes on a long, steep downgrade is
   only a supplement to the braking effect of
   the engine. True or False?
4. If you are away from your vehicle only a short
   time, you do not need to use the parking
   brake. True or False?
5. How often should you drain air tanks?
6. How do you brake when you drive a tractor-
   trailer combination with ABS?
7. You still have normal brake functions if your
   ABS is not working. True or False?

These questions may be on your test. If you can’t
answer them all, reread subsection 5.4.

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## Tips for driving in wintertime Wyoming

Before traveling any significant distance in wintertime Wyoming (and especially before driving in rural areas), motorists should make sure they have the following items in their vehicles:

- An emergency first-aid kit that’s well-stocked with medical supplies and bandages;
- A set of tire chains that fit;
- A shovel and small bag of sand, to use if your vehicle gets stuck;
- A snow brush, ice scraper, and a deicer to use on frozen door locks and wiper blades;
- Blankets, dehydrated foods and water in case you get stranded for an extended period;
- Some flares and flashlights for nighttime emergencies; and
- Booster cables in case of a dead battery.

### Before you go

- A brochure with tips about winter driving from WYDOT at dot.state.wy.us or by writing WYDOT Public Affairs Office, 5300 Bishop Blvd., Cheyenne, WY 82009-3340.

### Traffic can quickly back up when a storm hits.

Get a brochure filled with tips about winter driving from WYDOT at dot.state.wy.us or by writing WYDOT Public Affairs Office, 5300 Bishop Blvd., Cheyenne, WY 82009-3340.

## Section 6 — COMBINATION VEHICLES

### This Section Covers

- Driving Combinations
- Combination Vehicle Air Brakes
- Anti-lock Brake Systems
- Coupling and Uncoupling
- Inspecting Combinations

This section provides information needed to pass the tests for combination vehicles (tractor-trailer, doubles, triples, straight truck with trailer). The information is only to give you the minimum knowledge needed for driving common combination vehicles. You should also study Section 7 if you need to pass the test for doubles and triples.

### 6.1 – Driving Combination Vehicles Safely

Combination vehicles are usually heavier, longer, and require more driving skill than single commercial vehicles. This means that drivers of combination vehicles need more knowledge and skill than drivers of single vehicles. In this section, we talk about some important safety factors that apply specifically to combination vehicles.

#### 6.1.1 – Rollover Risks

More than half of truck driver deaths in crashes are the result of truck rollovers. When more cargo is piled up in the rear of a truck, the “center of gravity” moves higher up from the road. The truck becomes easier to turn over. Fully loaded rigs are ten times more likely to roll over in a crash than empty rigs.

The following two things will help you prevent rollover: keep the cargo as close to the ground as possible, and drive slowly around corners. Keeping cargo low will make it easier to stop than if you try to drive with high cargo.

### 6.1.2 – Steer Gently

Trucks with trailers have a dangerous “crack-the-whip” effect. When you make a quick lane change, the crack-the-whip effect can turn the trailer over. There are many crashes where only the trailer has overturned.

"Rearward amplification" causes the crack-the-whip effect. Figure 6.1 shows eight types of combination vehicles and the rearward amplification each has in a quick lane change. Rigs with the least crack-the-whip effect are shown at the top and those with the most, at the bottom. Rearward amplification of 2.0 in the chart means that the rear trailer is twice as likely to turn over as the tractor. You can see that triples have a rearward amplification of 3.5. This means you can roll the last trailer of triples 3.5 times as easily as a five-axle tractor.

Steer gently and smoothly when you are pulling trailers. If you make a sudden movement with your steering wheel, your trailer could tip over. Follow far enough behind other vehicles (at least one second for each 10 feet of your vehicle length, plus another second if going over 40 mph). Look far enough down the road to avoid being surprised and having to make a sudden lane change. At night, drive slowly enough to see obstacles with your headlights before it is too late to change lanes or stop gently. Slow down to a safe speed before going into a turn.

### 6.1.3 – Brake Early

Control your speed whether fully loaded or empty. Large combination vehicles take longer to stop when they are empty than when they are fully loaded. When lightly loaded, the very stiff suspension springs and strong brakes give poor traction and make it very easy to lock up the wheels. Your trailer can swing out and strike other vehicles. Your tractor can jackknife very quickly. You also must be very careful about driving “bobtail” tractors (tractors without semitrailers). Tests have shown that bobtails can be very hard to stop smoothly. It takes them longer to stop than a tractor-semitrailer loaded to maximum gross weight.

In any combination rig, allow lots of following distance and look far ahead, so you can brake early. Don’t be caught by surprise and have to make a “panic” stop.

### 6.1.4 – Railroad-highway Crossings

Railroad-highway crossings can also cause problems, particularly when pulling trailers with low underneath clearance.

These trailers can get stuck on raised crossings:

- Low slung units (lowboy, car carrier, moving van, possum-belly livestock trailer); and
- Single-axle tractor pulling a long trailer with its landing gear set to accommodate a tandem-axle tractor.

If for any reason you get stuck on the tracks, get out of the vehicle and away from the tracks. Check signs or signal housing at the crossing for emergency notification information. Call 911 or other emergency number. Give the location of the crossing using all identifiable landmarks, especially the DOT number, if posted.
6.1.5 – Prevent Trailer Skids
When the wheels of a trailer lock up, the trailer will tend to swing around. This is more likely to happen when the trailer is empty or lightly loaded. This type of jackknife is often called a "trailer jackknife." See Figure 6.2.

The procedure for stopping a trailer skid is:

Recognize the Skid. The earliest and best way to recognize that the trailer has started to skid is by seeing it in your mirrors. As you apply the brakes hard, check the mirrors to make sure the trailer is staying where it should be. Once the trailer swings out of your lane, it’s very difficult to prevent a jackknife.

Stop Using the Brake. Release the brakes to get traction back. Do not use the trailer hand brake (if you have one) to "straighten out the rig." This is the wrong thing to do since the brakes on the trailer wheels caused the skid in the first place. Once the trailer wheels grip the road again, the trailer will start to follow the tractor and straighten out.

6.1.6 – Turn Wide
When a vehicle goes around a corner, the rear wheels follow a different path than the front wheels. This is called off-tracking or "cheating." Figure 6.3 shows how off-tracking causes the path followed by a tractor to be wider than the rig itself. Longer vehicles will offtrack more. The rear wheels of the powered unit (truck or tractor) will offtrack some, and the rear wheels of the trailer will offtrack even more. If there is more than one trailer, the rear wheels of the last trailer will offtrack the most. Steer the front end wide enough around a corner so the rear end does not run over the curb, pedestrians, etc. However, keep the rear of your vehicle close to the curb. This is better than swinging wide to the left before starting the turn because it will keep other drivers from passing you on the right. See Figure 6.4.

6.1.7 – Backing with a Trailer.
Back with a Trailer. When backing a car, straight truck, or bus, you turn the top of the steering wheel in the direction you want to go. When backing a trailer, you turn the steering wheel in the opposite direction. Once the trailer starts to turn, you must turn the wheel the other way to follow the trailer.

Whenever you back up with a trailer, try to position your vehicle so you can back in a straight line. If you must back on a curved path, back to the driver’s side so you can see. See Figure 6.5.
Look at Your Path. Look at your line of travel before you begin. Get out and walk around the vehicle. Check your clearance to the sides and overhead, in and near the path your vehicle.

Use Mirrors on Both Sides. Check the outside mirrors on both sides frequently. Get out of the vehicle and re-inspect your path if you are unsure.

Back Slowly. This will let you make corrections before you get too far off course.

Correct Drift Immediately. As soon as you see the trailer getting off the proper path, correct it by turning the top of the steering wheel in the direction of the drift.

Pull Forward. When backing a trailer, make pull-ups to re-position your vehicle as needed.

Subsection 6.1 Test Your Knowledge
1. What two things are important to prevent rollover?
2. When you turn suddenly while pulling doubles, which brake controls or ‘emergency’ valves on older vehicles may not operate automatically. There may be a lever rather than a knob. The ‘normal’ position is used for pulling a trailer. The ‘emergency’ position is used to shut the air off and on the trailer emergency brakes.
3. Why should you not use the trailer hand brake to straighten out a jackknifing trailer?
4. What is offtracking?
5. When you back a trailer, you should position your vehicle so you can back in a curved path to the driver’s side. True or False?
6. What type of trailers can get stuck on railroad-highways?

These questions may be on your test. If you can’t answer them all, reread subsection 6.1

6.2 – Combination Vehicle Air Brakes
You should study Section 5: Air Brakes before reading this. In combination vehicles the braking system has parts to control the trailer brakes, in addition to the parts described in Section 5. These parts are described below.

6.2.1 – Trailer Hand Valve
The trailer hand valve (also called the trolley valve or Johnson bar) works the trailer brakes. The control valve allows you to open and shut the trailer brake. The trailer protection valve and controls or ‘emergency’ valves on older vehicles may not operate automatically. There may be a lever rather than a knob. The ‘normal’ position is used for pulling a trailer. The ‘emergency’ position is used to shut the air off and on the trailer emergency brakes.

6.2.4 – Trailer Air Lines
Every combination vehicle has two air lines, the service line and the emergency line. They run between each vehicle (tractor to trailer, trailer to dolly, dolly to second trailer, etc.)

Service Air Line. The service line (also called the control line or signal line) carries air, which is controlled by the trailer air supply control valve) control. Pull gently against them in a low gear to make sure the brakes work.

Emergency Air Line. The emergency line has two purposes. First, it supplies air to the trailer air tanks. Second, the emergency line controls the trailer brakes when the emergency brakes come on. The pressure in the service line will similarly change. The service line is connected to relay valves. These valves allow the trailer brakes to be applied more quickly than would otherwise be possible.

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6.2.5 – Hose Couplers (Gland Hands)
Gland hands are coupling devices used to connect the service and emergency air lines from the truck or tractor to the trailer. They open and shut a rubber seal, which prevents air from escaping. Clean the couplers and rubber seals before a connection is made. When connecting the glad hands, press the two seals together with the couplers at a 90 degree angle to each other. A turn of the glad hand attached to the hose will join and lock the couplers.

When coupling, make sure to couple the proper glad hands together. To help avoid mistakes, colors are sometimes used. Blue is used for the service lines and red for the emergency (supply) lines. Sometimes, metal tags are attached to the lines with the words ‘service’ and ‘emergency’ stamped on them. See Figure 6.6.

If you do cross the air lines, supply air will be sent to the service line instead of going to charge the trailer air tanks. Air will not be available to release the trailer spring brakes (parking brakes). If the spring brakes don’t release when you push the trailer air supply control, check the air line connections.

Older trailers do not have spring brakes. If the air supply in the trailer tank is lost, used there will be no emergency brakes, and the trailer wheels will turn freely. If you crossed the air lines, you could drive away but you wouldn’t have trailer brakes. This would be a very dangerous situation. Always test the trailer brakes before driving with the hand valve or by pulling the air supply (tractor protection valve) control. Pull gently against them in a low gear to make sure the brakes work.

Some vehicles have “dead end” or dummy couplers to which the hoses may be attached when they are not in use. This will prevent water and dirt from getting into the coupler and the air lines. Use the dummy couplers when the air lines are not connected to a trailer. If there are no dummy couplers, glad hands can sometimes be locked together (depending on the couplings). It is very important to keep the air supply clean.

6.2.6 – Trailer Air Tanks
Each trailer and converter dolly has one or more air tanks. They are filled by the emergency (supply) line from the tractor. They provide the air pressure used to operate trailer brakes. Air pressure is sent from the air tanks to the brakes by relay valves.

The pressure in the service line tells how much pressure the relay valves should send to the trailer brakes. The pressure in the service line is controlled by the brake pedal (and the trailer hand brake).

Figure 6.6
It is important that you don’t let water and oil build up in the air tanks. If you do, the brakes may not work correctly. Each tank has a drain valve on it and you should drain each tank every day. If your tanks have automatic drains, they will keep most moisture out. But you should still open the drains to make sure.

6.2.7 – Shut-off Valves
Shut-off valves (also called cut-out cocks) are used in the service and supply air lines at the back of trailers used to tow other trailers. These valves permit closing the air lines off when another trailer is not being towed. You must check that all shut-off valves are in the open position, except the ones at the back of the last trailer, which must be closed.

6.2.8 – Trailer Service, Parking and Emergency Brakes
Never trailers have spring brakes just like trucks and truck tractors. However, converter dollies and trailers built before 1975 are not required to have spring brakes. Those that do not have spring brakes have emergency brakes, which work from the air stored in the trailer air tank. The emergency brakes come on whenever the air pressure in the emergency line is lost. These trailers have no parking brake. The emergency brakes come on whenever the air supply knob is pulled out or the trailer is disconnected.
A major leak in the emergency line will cause the tractor protection valve to close and the trailer emergency brakes to come on. But the brakes will hold only as long as there is air pressure in the trailer air tank. Eventually, the air will leak away and then there will be no brakes. Therefore, it is very important for safety that you use wheel chocks when you park trailers without spring brakes.

You may not notice a major leak in the service line until you try to put the brakes on. Then, the air loss from the leak will lower the air tank pressure quickly. If it goes low enough, the trailer emergency brakes will come on.

### Subsection 6.2

#### Test Your Knowledge

1. **Describe what the trailer air supply control does.**
2. **Describe what the service line is for.**
3. **What is the emergency air line for?**
4. **Why should you use chocks when parking a trailer without spring brakes?**
5. **Where are shut-off valves?**

These questions may be on your test. If you can’t answer them all, reread subsection 6.2.

### 6.3 – Anti-lock Brake Systems

#### 6.3.1 – Trailers Required to Have ABS

All trailers and converter dollies built on or after March 1, 1998, are required to have ABS. However, many trailers and converter dollies built before this date have been voluntarily equipped with ABS.

Trailers will have yellow ABS malfunction lamps on the left side, either on the front or rear corner. See Figure 6.7. Dollies manufactured on or after March 1, 1998, are required to have a lamp on the left side.

In the case of vehicles manufactured before the required date, it may be difficult to tell if the unit is equipped with ABS. Look under the vehicle for the ECU and wheel speed sensor wires coming from the back of the brakes.

#### 6.3.2 – Braking with ABS

ABS is an addition to your normal brakes. It does not decrease or increase your normal braking capability. ABS only activates when wheels are about to lock up.

ABS does not necessarily shorten your stopping distance, but it helps you keep the vehicle under control during hard braking.

ABS helps you avoid wheel lock up. The computer senses impending lockup, reduces the braking pressure to a safe level, and you maintain control.

When only the trailer has ABS, the trailer is less likely to swing out, but if you lose steering control or start a tractor jackknife, let up on the brakes (if you can safely do so) until you gain control.

When you drive a tractor-trailer combination with ABS, you should brake as you always have. In other words:

- Use only the braking force necessary to stop safely and stay in control.
- Brake the same way, regardless of whether you have ABS on the tractor, the trailer, or both.
- If you slow down, monitor your tractor and trailer and back off the brakes (if it is safe to do so) to stay in control.

Remember, if your ABS malfunctions, you still have regular brakes. Drive normally, but get the system serviced soon.

ABS won’t allow you to drive faster, follow more closely, or drive less carefully.

#### 6.4 – Coupling and Uncoupling

Knowing how to couple and uncouple correctly is basic to safe operation of combination vehicles. Wrong coupling and uncoupling can be very dangerous. General coupling and uncoupling steps are listed below. There are differences between different rigs, so learn the details of coupling and uncoupling the truck(s) you will operate.

1. **Check for damaged/missing parts;**
2. **Check to see that mounting to tractor is secure, no cracks in frame, etc.;**
3. **Be sure that the fifth wheel plate is greased as required.**
4. **Failure to keep the fifth wheel plate lubricated could cause steering problems because of friction between the tractor and trailer;**
5. **Check if fifth wheel is in proper position for coupling:**

   - **Wheel tilted down toward rear of tractor;**
   - **Jaws open;**
   - **Safety unlocking handle in the automatic lock position;**
   - **If you have a sliding fifth wheel, make sure it is locked;**
   - **Make sure the kingpin is not bent or broken.**

#### Step 1. Inspect Fifth Wheel

- Put transmission in neutral;
- Shut off engine and take key with you so someone else won’t move truck while you are under it.

#### Step 3. Position Tractor

- Put the tractor directly in front of the trailer. (Never back under the trailer at an angle because you might push the trailer sideways and break the landing gear);
- Check position, using outside mirrors, by looking down both sides of the trailer.

#### Step 4. Back Slowly

- Back until fifth wheel just touches the trailer;
- Don’t hit the trailer.

#### Step 5. Secure Tractor

- Put on the parking brake;
- Put transmission in neutral.

#### Step 6. Check Trailer Height

- **The trailer should be low enough that it is raised slightly by the tractor when the tractor is backed under it. Raise or lower the trailer as needed.** (If the trailer is too low, the tractor may strike and damage the trailer nose; if the trailer is too high, it may not couple correctly);
- **Check that the kingpin and fifth wheel are aligned.**

#### Step 7. Connect Air Lines to Trailer

- **Check glad hand seals and connect tractor emergency air line to trailer emergency glad hand;**
- **Check glad hand seals and connect tractor service air line to trailer service glad hand;**
- **Make sure air lines are safely supported where they won’t be crushed or caught while tractor is backing under the trailer.**

#### Step 8. Supply Air to Trailer

- **From cab, push in “air supply” knob or move tractor protection valve control from the “emergency” to the “normal” position to supply air to the trailer brake system;**
- **Wait until the air pressure is normal;**
- **Check brake system for crossed air lines:**
  - **Shut engine off so you can hear the brakes;**
  - **Apply and release trailer brakes and listen for sound of trailer brakes being applied and released.** You should hear the brakes move when applied and air escape when the brakes are released.

#### Step 2. Inspect Area and Check Wheels

- **Make sure area around the vehicle is clear;**
- **Check that trailer wheels are checked or sprung brakes are on;**
- **Check that cargo (if any) is secured against movement due to tractor being coupled to the trailer.**
6.5  —  Inspecting a Combination Vehicle

Use the seven-step inspection procedure described in Section 2 to inspect your combination vehicle. There are more things to inspect on a combination vehicle than on a single vehicle. (For example, tires, wheels, lights, reflectors, etc.) However, there are a few other new things to check. These are discussed below.

6.5.1  —  Additional Things to Check During a Walkaround Inspection

Do these checks in addition to those already listed in Section 2.

Coupling System Areas

Check fifth wheel (lower) to make sure:

- There are no missing or damaged parts;
- There is greasy or loose coupling;
- There is no visible space between upper and lower fifth wheel;

Stop with tractor frame under trailer (prevents trailer from falling to ground if landing gear should collapse or sink).

Step 8. Secure Tractor

- Apply parking brake;
- Place transmission in neutral.

Step 9. Inspect Trailer Supports

Make sure ground is supporting trailer;
Make sure landing gear is not damaged.

Step 10. Pull Tractor Clear of Trailer

- Release parking brakes;
- Check the area and drive tractor forward until it clears.

Subsections 6.3 and 6.4

Test Your Knowledge

1. What might happen if the trailer is too high when you try to couple?
2. After coupling, how much space should be between the upper and lower fifth wheel?
3. You should look into the back of the fifth wheel to see if it is locked onto the kingpin. True or False?
4. To drive you need to raise the landing gear only until it just lifts off the pavement. True or False?
5. How do you know if your trailer is equipped with anti-lock brakes?

These questions may be on your test. If you can’t answer them all, reread subsections 6.3 and 6.4.

Section 6 — Combination Vehicles
Section 7
DOUBLES AND TRIPLES

This Section Covers
- Pulling Double/Triple Trailers
- Coupling and Uncoupling
- Inspecting Doubles and Triples
- Checking Air Brakes

This section has information you need to pass the CDL knowledge test for driving safely with double and triple trailers. It tells about how important it is to be very careful when driving with more than one trailer, how to couple and uncouple correctly, and about inspecting doubles and triples carefully. (You should also study Sections 2, 5, and 6.)

7.1 – Pulling Double/Triple Trailers

Take special care when pulling two and three trailers. There are more things that can go wrong, and doubles/triples are less stable than other commercial vehicles. Some areas of concern are discussed below.

7.1.1 – Prevent Trailer from Rolling Over
To prevent trailers from rolling over, you must steer gently and go slowly around corners, on ramps, off ramps, and curves. A safe speed on a curve for a straight truck or a single trailer combination vehicle may be too fast for a set of doubles or triples.

7.1.2 – Beware of the Crack-the-whip Effect
Doubles and triples are more likely to turn over than other combination vehicles because of the “crack-the-whip” effect. You must steer gently when pulling trailers. The last trailer in a combination is most likely to turn over. If you don’t understand the crack-the-whip effect, study subsection 6.1.2 of this manual.

7.1.3 – Inspect Completely
There are more critical parts to check when you have two or three trailers. Check them all. Follow the procedures described later in this section.

7.1.4 – Look Far Ahead
Doubles and triples must be driven very smoothly to avoid rollover or jackknife. Therefore, look far ahead so you can slow down or change lanes gradually when necessary.

7.1.5 – Manage Space
Doubles and triples take up more space than other commercial vehicles. They are not only longer, but also need more space because they can’t be turned or stopped suddenly. Allow more following distance. Make sure you have large enough gaps before entering or crossing traffic. Be certain you are clear at the sides before changing lanes.

7.1.6 – Adverse Conditions
Be more careful in adverse conditions. In bad weather, slippery conditions, and mountain driving, you must be especially careful if you drive double and triple bottoms. You will have greater length and more dead axles to pull with your drive axles than other drivers. There is more chance for skids and loss of traction.

7.1.7 – Parking the Vehicle
Make sure you do not get in a spot you cannot pull straight through. You need to be aware of how parking lots are arranged in order to avoid a long and difficult escape.

7.1.8 – Anti-lock Braking Systems on Converter Dollies
Converter dollies built on or after March 1, 1998, are required to have anti-lock brakes. These dollies will have a yellow lamp on the left side of the dolly.

7.2 – Coupling and Uncoupling

Knowing how to couple and uncouple correctly is basic to safe operation of doubles and triples. Wrong coupling and uncoupling can be very dangerous. Coupling and uncoupling steps for doubles and triples are listed below.

7.2.1 – Coupling Twin Trailers

Secure Second (Rear) Trailer
If the second trailer doesn’t have spring brakes, drive the tractor close to the trailer, connect the emergency line, charge the trailer air tank, and disconnect the emergency line. This will set the trailer emergency brakes (if the slack adjusters are correctly adjusted). Chock the wheels if you have any doubt about the brakes.

For the safest handling on the road, the more heavily loaded semitrailer should be in first position behind the tractor. The lighter trailer should be in the rear.

A converter gear on a dolly is a coupling device of one or two axles and a fifth wheel by which a semitrailer can be coupled to the rear of a tractor-trailer combination forming a double bottom rig. See Figure 7.1.

Position Converter Dolly in Front of Second (Rear) Trailer
Release dolly brakes by opening the air tank petcock. (Or, if the dolly has spring brakes, use the dolly parking brake control.)

If the distance is not too great, wheel the dolly into position by hand so it is in line with the kingpin.

Or, use the tractor and first semitrailer to pick up the converter dolly:
- Position combination as close as possible to converter dolly.
Section 7 — Doubles and Triples

7.2 – Uncoupling Twin Trailers

Uncouple Rear Trailer
- Park rig in a straight line on firm level ground;
- Apply parking brakes so rig won't move;
- Check wheels of second trailer if it doesn’t have spring brakes;
- Lower landing gear of second semitrailer enough to remove some weight from dolly;
- Close air shut-offs at rear of first semitrailer (and on dolly if so equipped);
- Disconnect all dolly air and electric lines and secure them;
- Release dolly brakes;
- Release converter dolly fifth wheel latch;
- Slowly pull tractor, first semitrailer, and dolly forward to pull dolly out from under rear semitrailer.

Uncouple Converter Dolly
- Lower dolly landing gear;
- Disconnect safety chains;
- Apply converter gear spring brakes or chocks;
- Release pintle hook on first semitrailer;
- Slowly pull dolly forward.

Never unlock the pintle hook with the dolly still under the rear trailer. The dolly tow bar may fly up, possibly causing injury, and making it very difficult to re-couple.

7.2.2 – Uncoupling Twin Trailers

Uncouple Rear Trailer
- Park rig in a straight line on firm level ground;
- Apply parking brakes so rig won't move;
- Check wheels of second trailer if it doesn’t have spring brakes;
- Lower landing gear of second semitrailer enough to remove some weight from dolly;
- Close air shut-offs at rear of first semitrailer (and on dolly if so equipped);
- Disconnect all dolly air and electric lines and secure them;
- Release dolly brakes;
- Release converter dolly fifth wheel latch;
- Slowly pull tractor, first semitrailer, and dolly forward to pull dolly out from under rear semitrailer.

Uncouple Converter Dolly
- Lower dolly landing gear;
- Disconnect safety chains;
- Apply converter gear spring brakes or chocks;
- Release pintle hook on first semitrailer;
- Slowly pull dolly forward.

Never unlock the pintle hook with the dolly still under the rear trailer. The dolly tow bar may fly up, possibly causing injury, and making it very difficult to re-couple.

7.2.3 – Coupling and Uncoupling Triple Trailers

Couple Tractor/First Semitrailer to Second/Third Trailers
- Make sure trailer brakes are locked and/or wheels chocked;
- Make sure trailer height is correct. (It must be slightly lower than the center of the fifth wheel, so trailer is raised slightly when dolly is pushed under);
- Connect Converter Dolly to Front Trailer;
- Connect Converter Dolly to Rear Trailer;
- Connect Converter Dolly to Front Trailer;
- Move converter dolly into position and couple first trailer to second trailer using the method for coupling doubles. Triples rig is now complete.

Uncouple Triple-trailer Rig
- Uncouple third trailer by pulling the dolly out, then unhitching the dolly using the method for uncoupling doubles;
- Uncouple remainder of rig as you would any double-bottom rig using the method already described.

7.2.4 – Coupling and Uncoupling Other Combinations

The methods described so far apply to the more common tractor-trailer combinations. However, there are other ways of coupling and uncoupling the many types of truck-trailer and tractor-trailer combinations that are in use. There are too many to cover in this manual. You will need to learn the correct way to couple and uncouple the vehicle(s) you will drive according to the manufacturer and/or owner specifications.

7.3 – Inspecting Doubles and Triples

Use the seven-step inspection procedure described in Section 2 to inspect your combination vehicle. There are more things to inspect on a combination vehicle than on a single vehicle. Many of these items are simply more of what you would find on a single vehicle. (For example, tires, wheels, lights, reflectors, etc.) However, there are also some new things to check. These are discussed below.

7.3.1 – Additional Checks

Do these checks in addition to those already listed in Section 2, Step 5: Do Walkaround Inspection.

Coupling System Areas
- Check fifth wheel (lower):
  - Securely mounted to frame;
  - No missing or damaged parts;
  - Enough grease;
  - No visible space between upper and lower fifth wheel;
  - Locking jaws around the shank, not the head of kingpin;
  - Release arm properly seated and safety latch/lock engaged.

- Check fifth wheel (upper):
  - Glide plate securely mounted to trailer frame;
  - Kingpin not damaged.

Air and electric lines to trailer:
- Electrical cord firmly plugged in and secured;
- Air lines properly connected to glad hands, no air leaks, properly secured with enough slack for turns;
- All lines free from damage.

Sliding fifth wheel:
- Slide not damaged or parts missing;
- Properly greased;
- All locking pins present and locked in place;
- If air powered, no air leaks;
- Check that fifth wheel is not so far forward that tractor frame will hit landing gear, or cab will hit the trailer, during turns.

Landing Gear
- Fully raised, no missing parts, not bent or otherwise damaged;
- Crank handle in place and secured;
- If power operated, no air or hydraulic leaks.

Double and Triple Trailers
- Shut-off valves (at rear of trailers, in service and emergency lines):
  - Rear of front trailers OPEN;
  - Front of last trailer CLOSED;
  - Converter dolly air tank drain valve CLOSED;
- Be sure air lines are supported and glad hands are properly connected;
- If spare tire is carried on converter gear (dolly), make sure it's secured;
- Be sure pintle-eye of dolly is in place in pintle hook of trailer(s);
- Make sure pintle hook is latched;
- Safety chains should be secured to trailer(s);
- Be sure light cords are firmly in sockets on trailers.

7.3.2 – Additional Things to Check During a Walkaround Inspection

Do these checks in addition to subsection 5.3, Inspecting Air Brake Systems.

7.4 – Doubles/Triples Air Brake Check

Check the brakes on a double or triple trailer as you would any combination vehicle. Subsection 6.5.2 explains how to check air brakes on combination vehicles. You must also make the following checks on your double or triple trailers.

7.4.1 – Additional Air Brake Checks

Check that Air Flows to All Trailers (Double and Triple Trailers). Use the tractor parking brake and/or check the wheels to hold the vehicle. Wait for air pressure to reach normal, then push in the red “tractor air supply” knob. This will supply air to the emergency (“supply”) lines. Use the tractor brake handle to press air to the service line. Go to the rear of the rig. Open the emergency line shut-off valve at the rear of the last trailer. You should hear air escaping, showing the entire system is charged. Close the emergency line valve. Open the service line valve to check that service pressure goes through all the trailers (this test assumes that the trailer brake or the service brake pedal is on), and then close the valve. If you DO NOT hear air escaping from both lines, check that the shut-off valves on the trailer(s) and dolly(ies) are in the OPEN position. YOU MUST have air all the way to the back for all the brakes to work.

Test Tractor Protection Valve. Charge the tractor air brake system. (That is, build up normal air pressure and push the “air supply” knob in.) Shut the engine off. Step on and off the brake pedal several times to reduce the air pressure in the tanks. The tractor air supply control (also called the tractor protection valve) should pop out (or go from “normal” to “emergency” position) when the air pressure falls into the pressure range specified by the manufacturer (Usually within the range of 20 to 45 psi).

If the tractor protection valve doesn’t work properly, an air hose or trailer brake leak could drain all the air from the tractor. This would cause the emergency brakes to come on, with possible loss of control.

Test Trailer Emergency Brakes. Charge the trailer air brake system and check that the trailer rolls freely. Then stop and pull out the trailer air supply control (also called tractor protection valve control or trailer emergency valve) or place it in the “emergency” position. Pull gently on the trailer with the tractor to check that the trailer emergency brakes are on.
**Section 8**

**TANK VEHICLES**

This section covers:
- **Inspecting Tank Vehicles**
- **Driving Tank Vehicles**
- **Safe Driving Rules**

8.1 – Inspecting Tank Vehicles

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, and;
- 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; and
- Built in fire extinguisher.

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

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 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 the road.
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 tanks 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.

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 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) are 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 handling 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 have copies of the rules for driver use. Find out where you can get your own copy to use on the job.

The regulations require training and testing for all drivers involved in transporting hazardous materials. Your employer or a designated representative is required to provide this training and testing. Hazardous materials employers are required to keep a record of that training on each employee as long as that employee is working with hazardous materials, and for 90 days thereafter. The regulations require that hazardous materials employees be trained and tested at least once every three years. By March 24, 2006, all drivers must be trained in the security risks of hazardous materials transportation. This training must include how to recognize and respond to possible security threats.

The regulations also require that drivers have within the previous two years special written training before driving a vehicle transporting certain flammable gas materials or highway route controlled quantities of radioactive materials. In addition, drivers transporting cargo tanks and portable tanks must receive specialized training. Each driver’s employer or his or her designated representative must provide such training once every three years.

Some locations require permits to transport certain explosives or bulk hazardous waste. States and counties also may require drivers to follow special hazardous materials routes. The federal government may require permits or exemptions for special hazardous materials cargo such as rocket fuel. Find out about permits, exemptions, and special routes for the places you drive.

9.1 – The Intent of the Regulations

9.1.1 – Contain the Material
Transporting hazardous materials can be risky. The regulations are intended to protect you, those around you, and the environment. They tell shippers how to package the materials safely and drivers how to load, transport, and unload the material. These are called “containment rules.”

9.1.2 – Communicate the Risk
To communicate the risk, shippers must warn drivers and others about the materials hazards. The regulations require
shippers to put hazard warning labels on packages, provide proper shipping papers, emergency response information, and placards. These steps communicate the hazard to the shipper, the carrier, and the driver.

9.1.3 – Assure Safe Drivers and Equipment
In order to get a hazardous materials endorsement on a CDL, you must pass a written test about transporting hazardous materials. To pass the test, you must know how to:
- Identify what are hazardous materials;
- Safely load shipments;
- Properly placard your vehicle in accordance with the rules; and
- Safely transport shipments.

Learn the rules and follow them. Following the rules reduces the risk of injury from hazardous materials. Taking shortcuts or breaking rules is unsafe. Rule breakers can be fined and put in jail.

Inspect your vehicle before and during each trip. Law enforcement officers may stop and inspect your vehicle. When stopped, they may check your shipping papers, vehicle placards, and the hazardous materials endorsement on your driver license, and your knowledge of hazardous materials.


9.2.1 – The Shipper
- Sends products from one place to another by truck, rail, vessel, or airplane;
- Uses the hazardous materials regulations to determine the product’s:
  - Proper shipping name;
  - Hazard class;
  - Identification number;
  - Packing group;
  - Correct packaging;
  - Correct label and markings; and
- Must package, mark, and label the materials; prepare shipping papers; provide emergency response information; and supply placards; and
- Certify on the shipping paper that the shipment has been prepared according to the rules (unless you are pulling cargo tanks supplied by you or your employer).

9.2.2 – The Carrier
- Takes the shipment from the shipper to its destination;
- Prior to transportation, checks that the shipper correctly described, marked, labeled, and otherwise prepared the shipment for transportation;
- Refuses improper shipments; and
- Reports crashes and incidents involving hazardous materials to the proper government agency.

9.2.3 – The Driver
- Makes sure the shipper has identified, marked, and labeled the hazardous materials properly;
- Refuses leaking packages and shipments;
- Placards vehicle when loading, if required;
- Safely transports the shipment without delay;
- Follows all special rules about transporting hazardous materials; and
- Keeps hazardous materials shipping papers and emergency response information in the proper place.

9.3 – Communication Rules

9.3.1 – Definitions
Some words and phrases have special meanings when talking about hazardous materials. Some of these may differ from meanings you are used to. The words and phrases in this section may be on your test. The meanings of other important words are in the glossary at the end of Section 9.

A material’s hazard class reflects the risks associated with it. There are nine different hazard classes. The types of materials included in these nine classes are in Figure 9.1. A shipping paper describes the hazardous materials being transported. Shipping orders, bills of lading, and manifests are all shipping papers. Figure 9.6 shows an example shipping paper.

After a crash or hazardous materials spill or leak, you may be injured and unable to communicate the hazards of the materials you are transporting. Firefighters and police can be injured and unable to communicate the hazards of the materials you are transporting. Firefighters and police can prevent or reduce the amount of damage or injury at the scene if they know what hazardous materials are being carried. Your life, and the lives of others, may depend on quickly locating the hazardous materials shipping papers. For that reason the rules require:
- Shippers to describe hazardous materials correctly and include an emergency response telephone number on shipping papers;
- Carriers and drivers to put tabs on hazardous materials shipping papers, or keep them on top of other shipping papers and keep the required emergency response information with the shipping papers; and
- Drivers to keep hazardous materials shipping papers:
  - In a pouch on the driver’s door; or
  - In clear view within immediate reach while the seat belt is fastened while driving; or
  - On the driver’s seat when out of the vehicle.

9.3.2 – Package Labels
Shippers put diamond-shaped hazard warning labels on most hazardous materials packages. These labels inform others of the hazard. If the diamond label won’t fit on the package, shippers may put the label on a tag securely attached to the package. For example, compressed gas cylinders that will not hold a label will have tags or decals. Labels look like the examples in Figure 9.2.

9.3.3 – Lists of Regulated Products
Placards. Placards are used to warn others of hazardous materials. Placards are signs put on the outside of a vehicle and on bulk packages, which identify the hazard class of the cargo. A placarded vehicle must have at least four identical placards. They are put on the front, rear, and both sides of the vehicle. See Figure 9.3. Placards must be readable from all four directions. They are at least 10 3/4 inches square, square-on-point, in a diamond shape. Cargo tanks and other bulk packaging display the identification number of their contents on placards or orange panels or white square-on-point displays that are the same size as placards.

Identification numbers are a four-digit code used by first responders to identify hazardous materials. An identification number may be used to identify more than one chemical. The letters “NA” or “UN” will precede the identification number. The United States Department of Transportation’s Emergency Response Guidebook (ERG) identifies to which chemicals all identification numbers are assigned.

<table>
<thead>
<tr>
<th>Class</th>
<th>Division</th>
<th>Name of Class or Division</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.1</td>
<td>Mass Explosives</td>
<td>Dynamite</td>
</tr>
<tr>
<td></td>
<td>1.2</td>
<td>Projection Hazards</td>
<td>Display Fireworks</td>
</tr>
<tr>
<td></td>
<td>1.3</td>
<td>Mass Fire Hazards</td>
<td>Ammunition</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td>Very Inexplosive</td>
<td>Arming</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>Extreme Insensitive</td>
<td>Blasting Agents</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>Flammable Gases</td>
<td>Propane</td>
</tr>
<tr>
<td></td>
<td>2.2</td>
<td>Non-Flammable Gases</td>
<td>Helium</td>
</tr>
<tr>
<td></td>
<td>2.3</td>
<td>Poisonous/Toxic Gases</td>
<td>Fluorine, Compressed</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Flammable Liquids</td>
<td>Gasoline</td>
</tr>
<tr>
<td>4</td>
<td>4.1</td>
<td>Flammable Gases</td>
<td>Ammonium Picrate</td>
</tr>
<tr>
<td></td>
<td>4.2</td>
<td>Spontaneously Combustible</td>
<td>Wetted</td>
</tr>
<tr>
<td></td>
<td>4.3</td>
<td>When Wet</td>
<td>White Phosphorus Sodium</td>
</tr>
<tr>
<td>5</td>
<td>5.1</td>
<td>Oxidizers</td>
<td>Ammonium Nitrate</td>
</tr>
<tr>
<td></td>
<td>5.2</td>
<td>Organic Peroxides</td>
<td>Methyl Ethyl Ketone Peroxide</td>
</tr>
<tr>
<td>6</td>
<td>6.1</td>
<td>Poison (Toxic Material)</td>
<td>Sodium Cyanide</td>
</tr>
<tr>
<td></td>
<td>6.2</td>
<td>Infectious Substances</td>
<td>Anthrax Virus</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Radioactive</td>
<td>Uranium</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Corrosives</td>
<td>Battery Fluid</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Miscellaneous</td>
<td>Polychlorinated Biphenyls (PCB)</td>
</tr>
<tr>
<td>e</td>
<td></td>
<td>OR-M-D (Other Regulated Material Domestic)</td>
<td>Food Flavorings, Medicines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Combustible Liquids</td>
<td>Fuel Oil</td>
</tr>
</tbody>
</table>

Examples of HAZMAT Labels. Figure 9.2

<table>
<thead>
<tr>
<th>Hazardous Materials Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
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<tr>
<td></td>
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<td>2</td>
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<td>5</td>
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<td>6</td>
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<td>7</td>
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<tr>
<td>8</td>
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<tr>
<td>9</td>
</tr>
<tr>
<td>e</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Examples of HAZMAT Labels. Figure 9.2

9.3.2 – Package Labels
Shippers put diamond-shaped hazard warning labels on most hazardous materials packages. These labels inform others of the hazard. If the diamond label won’t fit on the package, shippers may put the label on a tag securely attached to the package. For example, compressed gas cylinders that will not hold a label will have tags or decals. Labels look like the examples in Figure 9.2.
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There are three main lists used by shippers, carriers, and drivers when trying to identify hazardous materials. Before transporting a material, look for its name on three lists. Some materials are on all lists, others on only one. Always check the following lists:

- Section 172.101, the Hazardous Materials Table;
- Appendix A to Section 172.101, the List of Hazardous Substances and Reportable Quantities; and
- Appendix B to Section 172.101, the List of Marine Pollutants.

The Hazardous Materials Table. Figure 9.4 shows part of the Hazardous Materials Table. Column 1 tells which shipping mode(s) the entry affects and other information concerning the shipping description. The next five columns show each material's shipping name, hazard class or division, identification number, packaging group, and required labels. Six different symbols may appear in Column 1 of the table:

- Shows the proper shipping name, hazard class, and packaging group to use, even if the material doesn't meet the hazard class definition.
- Means the hazardous material described in Column 2 is subject to the HMRI only when offered or intended for transport by air unless it is a hazardous substance or marine pollutant.
- Means the proper shipping name is appropriate for describing materials for domestic transportation, but may not be proper for international transportation.
- Identifies a proper shipping name that is used to describe materials in international transportation. A different shipping name may be used when only domestic transportation is involved.
- Means this hazardous material described in Column 2 is a generic shipping name. A generic shipping name must be accompanied by a technical name on the shipping paper. A technical name is a specific chemical that makes the product hazardous.
- Column 2 lists the proper shipping names and descriptions of regulated materials. Entries are in alphabetical order so you can more quickly find the right entry. The table shows proper shipping names in regular type. The shipping paper must show proper shipping names. Names shown in italics are not proper shipping names.

Column 3 shows a material's hazard class or division, or the entry "Forbidden." Never transport a "Forbidden" material. You placed shipments based on the quantity and hazard class. You can decide which placards to use if you know these three things:

- Material's hazard class;
- Amount being shipped; and
- Amount of all hazardous materials of all classes on your vehicle.

Column 4 lists the identification number for each proper shipping name. Identification numbers are preceded by the letters "UN" or "NA." The letters "NA" are associated with proper shipping names that are only used within the United States and to and from Canada. The identification number must appear on the shipping paper as part of the shipping description and also appear on the package. It also must appear on cargo tanks and other bulk packaging. Police and firefighters use this number to quickly identify the hazardous materials.

Column 5 shows the packaging group (in Roman numeral) assigned to a material.

Column 6 shows the hazard warning label(s) shippers must put on packages of hazardous materials. Some products require use of more than one label due to a dual hazard being present. No label is needed where the table shows the word NONE.

Column 7 lists the additional (special) provisions that apply to this material. When there is an entry in this column, you must refer to the federal regulations for specific information. The numbers 1-6 in this column mean the hazardous material is a poison inhalation hazard (PIH). PIH materials have special requirements for shipping papers, marking, and placards.

Column 8 is a three-part column showing the sections numbers covering the packaging requirements for each hazardous material.

Note: Columns 9 and 10 do not apply to transportation by highway.

Appendix A to 49 CFR 172 - The List of Hazardous Substances and Reportable Quantities. The DOT and the EPA want to know about spills of hazardous substances. They are named in the List of Hazardous Substances and Reportable Quantities. See Figure 9.5. Column 3 of the list shows each product's reportable quantity (RQ). When these materials are being transported in a reportable quantity or greater in one package, the shipper displays the letters RQ on the shipping paper and package.
Section 9 — Hazardous Materials

9.3.4 – The Shipping Paper

The shipping paper shown in Figure 9.6 describes a shipment. A shipping paper for hazardous materials must include:

- Page numbers if the shipping paper has more than one page. The first page must tell the total number of pages. For example, “Page 1 of 4.”
- A proper shipping description for each hazardous material;
- A shipper’s certification, signed by the shipper, saying they prepared the shipping according to the rules.

9.3.5 – The Item Description

If a shipping paper describes both hazardous and non-hazardous products, the hazardous materials will be either:

- Described first;
- Highlighted in a contrasting color; or
- Identified by an “X” placed before the shipping name in a column captioned “HM.” The letters “RQ” may be used instead of “X” if a reportable quantity is present in one package.

The basic description of hazardous materials includes the proper shipping name, hazard class or division, the identification number, and the packing group, if any, in that order. The packing group is displayed in Roman numerals and may be preceded by “PG.”

Shipping name, hazard class, and identification number must not be abbreviated unless specifically authorized in the hazardous materials regulations. The description must also show:

- The total quantity and unit of measure;
- If the letters RQ appear, the name of the hazardous substance;
- For all materials with the letter “G” (Generic) in Column 1, the technical name of the hazardous material. Shipping papers also must list an emergency response telephone number. The emergency response telephone number is the responsibility of the shipper. It can be used by emergency responders to obtain information about any hazardous materials involved in a spill or fire. Some hazardous materials do not need a telephone number. You should check the regulations for a listing.

Shippers also must provide emergency response information to the motor carrier for each hazardous material being shipped. The emergency response information must be able to be accessed away from the motor vehicle and must provide information on how to safely handle incidents involving the material. It must include information on the shipping name of the hazardous materials, risks to health, fire, explosion, and initial methods of handling spills, fires, and leaks of the materials.

This information can be on the shipping paper or some other document that includes the basic description and technical name of the hazardous material. Or, it may be in a guidance book such as the Emergency Response Guidebook (ERG). Motor carriers may assist shippers by keeping an ERG on each vehicle carrying hazardous materials. The driver must provide the emergency response information to any federal, state, or local authority responding to a hazardous materials incident or investigating one. Total quantity must appear before or after the basic description. The packaging type and the unit of measurement may be abbreviated. For example:

10 ctns. Paint, 3, UN1263, PG II, 500 lbs.

The shipper of hazardous wastes must put the word “WASTE” before the proper shipping name of the material on the shipping paper (hazardous waste manifest). For example:

Waste Acetone, 3, UN1090, PG II.

A non-hazardous material may not be described by using a hazard class or an identification number.

9.3.6 – Shippers Certification

When the shipper packages hazardous materials, he/she certifies that the package has been prepared according to the rules. The signed shipper’s certification appears on the original shipping paper. The only exceptions are when a shipper is a private carrier transporting their own product and when the package is provided by the carrier (for example, a cargo tank). Unless a package is clearly unsafe or does not comply with the HMR, you may accept the shipper’s certification concerning proper packaging.

Some carriers may have rules about transporting hazardous materials. Follow your employer’s rules when accepting shipments.

9.3.7 – Package Markings and Labels

Shippers print required markings directly on the package, an attached label, or tag. An important package marking is the name of the hazardous materials. It is the same name as the one on the shipping paper. The requirements vary by package size and material being transported. When required, the shipper will put the following on the package:

- The name and address of shipper or consignee;
- The hazardous materials’ shipping name and identification number;
- The labels required.

It is a good idea to compare the shipping paper to the markings and labels. Always make sure that the shipper shows the correct basic description on his shipping paper and verifies that the proper labels are shown on the packages. If you are not familiar with the material, ask the shipper to contact the manufacturer. If rules require it, the shipper will put “RQ, MARINE POLLUTANT, BIOHAZARD, HOT, or INHALATION-HAZARD” on the package. Packages with liquid containers inside will also have package orientation markings with the arrows pointing in the correct upright direction. The labels used always reflect the hazard class of the product. If a package needs more than one label, the labels will be close together, near the proper shipping name.

9.3.8 – Recognizing Hazardous Materials

Learn to recognize shipments of hazardous materials. To find out if the shipment includes hazardous materials, look at the shipping paper. Does it have:

- An entry with a proper shipping name, hazard class, and identification number; or
- A highlighted entry, or one with an “X” or RQ in the hazardous materials column?

Other clues suggesting hazardous materials:

- What business is the shipper or shipper’s dealer? Chemical supply? Scientific supply house? Pest control or agricultural supplier? Explosives, munitions, or fireworks dealer?
- Are there tanks with diamond labels or placards on the premises?
- What type of package is being shipped? Cylinders and drums are often used for hazardous materials shipments.
- Is a hazard class label, proper shipping name, or identification number on the package?
- Are there any handling precautions?

9.3.9 – Hazardous Waste Manifest

When transporting hazardous wastes, you must sign by hand and carry a Uniform Hazardous Waste Manifest. The name and EPA registration number of the carriers, carriers’ offices, and destination must appear on the manifest. Shippers must prepare, date, and sign by hand the manifest. Treat the manifest as a shipping paper when transporting the waste. Only give the waste shipment to another registered carrier or disposal/treatment facility. Each carrier transporting the shipment must sign by hand the manifest. After you deliver the shipment, keep your copy of the manifest. Each copy must have all needed signatures and dates, and be signed by those of the person to whom you delivered the waste.
9.3.10 – Placarding

Attach the appropriate placards to the vehicle before you drive it. You are only allowed to move an improperly placarded vehicle during an emergency, in order to protect life or property.

Placards may appear on both sides and both ends of the vehicle. Each placard must be:
- Easily seen from the direction it faces;
- Placed so the words or numbers are level and read from left to right;
- At least three inches away from any other markings;
- Kept clear of attachments or devices such as ladders, doors, and tarpaulins;
- Kept clean and undamaged so that the color, format, and message are easily seen, and
- Be affixed to a background of contrasting color.

In addition, the use of “Drive Safely” and other slogans is prohibited; and, the front placard may be on the front of the tractor or the front of the trailer.

To decide which placards to use, you need to know:
- The hazard class of the materials;
- The amount of hazardous materials shipped; and
- The total weight of all classes of hazardous materials in your vehicle.

9.3.11 – Placard Tables

There are two placard tables, Table 1 and Table 2. Table 1 materials must be placarded whenever any amount is transported. See Figure 9.7.

Except for bulk packagings, the hazard classes in Table 2 need placards only if the total amount transported is 1,001 pounds or more including the packaging. Add the amounts from all shipping papers for all the Table 2 products you have on board. See Figure 9.8.

You may use DANGEROUS placards instead of separate placards for hazardous materials even if not required so long as the placard identifies the hazard of the material being transported.

The dangerous placard is an option, not a requirement. You can always placard for the materials.

Materials with a secondary hazard of dangerous when wet must display the DANGEROUS WHEN WET placard in addition to any other placards needed by the product’s hazard class. The 1,001 pound exception to placarding does not apply to these materials.

Placards used to identify the primary or subsidiary hazard class of a material must have the hazard class or division number as appropriate.

Placards may be displayed for hazardous materials even if not required so long as the placard identifies the hazard of the material being transported.

A bulk packaging is a single container with a capacity of 119 gallons or more. A bulk package, and a vehicle transporting a bulk package, must be placarded, even if it only has the residue of a hazardous material. Certain bulk packaging only have to be placarded on the two opposite sides or may display labels. All other bulk packages must be placarded on all four sides.

Figure 9.7

Placard Table 1

<table>
<thead>
<tr>
<th>Any Amount</th>
<th>Placard A.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Mass Explosives</td>
<td>Explosives 1.1</td>
</tr>
<tr>
<td>1.2 Project Hazards</td>
<td>Explosives 1.2</td>
</tr>
<tr>
<td>1.3 Mass Fire Hazards</td>
<td>Explosives 1.3</td>
</tr>
<tr>
<td>2.3 Poisonous/Toxic Gases</td>
<td>Poison Gas</td>
</tr>
<tr>
<td>4.3 Spontaneously Combustible When Wet</td>
<td>Dangerous When Wet</td>
</tr>
<tr>
<td>5.2 (Organic Peroxide, Type B, liquid or solid, Temperature controlled)</td>
<td>Organic Peroxide</td>
</tr>
<tr>
<td>6.1 (Inhalation hazard zone A &amp; B only)</td>
<td>Poison</td>
</tr>
<tr>
<td>7 (Radioactive Yellow III label only)</td>
<td>Radioactive</td>
</tr>
</tbody>
</table>

Figure 9.8

Placard Table 2

<table>
<thead>
<tr>
<th>1,001 Pounds Or More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category of Material (Hazard class or division number and additional description, as appropriate)</td>
</tr>
<tr>
<td>1.4 Very Inflammable</td>
</tr>
<tr>
<td>1.5 Extreme Inflammable</td>
</tr>
<tr>
<td>1.6</td>
</tr>
<tr>
<td>2.1 Flammable Gases</td>
</tr>
<tr>
<td>2.2 Non-Flammable Gases</td>
</tr>
<tr>
<td>3 Flammable Liquids</td>
</tr>
<tr>
<td>3.1 Spontaneously Combustible</td>
</tr>
<tr>
<td>4.1 Flammable Gases</td>
</tr>
<tr>
<td>4.2 Spontaneously Combustible</td>
</tr>
<tr>
<td>5.1 Oxidizers</td>
</tr>
<tr>
<td>5.2 (other than organic peroxide, Type B, liquid or solid, Temperature Controlled)</td>
</tr>
<tr>
<td>6.1 (other than inhalation hazard zone A or B)</td>
</tr>
<tr>
<td>6.2 Infectious Substances</td>
</tr>
<tr>
<td>8 Corrosives</td>
</tr>
<tr>
<td>9 Miscellaneous Hazardous Materials</td>
</tr>
<tr>
<td>ORM-O</td>
</tr>
<tr>
<td>FLAMMABLE may be used in place of a COMBUSTIBLE on a cargo tank or portable tank.</td>
</tr>
<tr>
<td>Class 9 Placard is not required for domestic transportation.</td>
</tr>
</tbody>
</table>

Figure 9.9

9.4 – Loading and Unloading

Do all you can to protect containers of hazardous materials. Do not use any tools, which might damage containers or other packaging during loading. Do not use hooks.

9.4.1 – General Loading Requirements

Before loading or unloading, set the parking brake. Make sure the vehicle will not move.

Many products become more hazardous when exposed to heat. Load hazardous materials away from heat sources. Watch for signs of leaking or damaged containers: LEAKS SPELL TROUBLE! Do not transport leaking packages.

Depending on the material, you, your truck, and others could be in danger. It is illegal to move a vehicle with leaking hazardous materials.

Containers of Class 1 (explosives), Class 3 (flammable liquids), Class 4 (flammable solids), Class 5 (oxidizers), Class 8 (corrosives), Class 2 (gases), Division 6.1 (poisoi, and Class 7 (radioactive) must be braced to prevent movement of the packages during transportation.

No Smoking. When loading or unloading hazardous materials, keep fire away. Do not let people smoke nearby. Never smoke around:
- Class 1 (Explosives);
- Class 2.1 (Flammable Gas);
- Class 3 (Flammable Liquids);
- Class 4 (Flammable Solids); and
- Class 5 (Oxidizers).

Secure Against Movement. Brace containers so they will not fall, slide, or bounce during transportation. Be very careful when loading containers that have valves or other fittings. All hazardous materials packages must be secured during transportation.

After loading, do not open any package during your trip. Never transfer hazardous materials from one package to another while in transit. You may empty a cargo tank, but do not empty any other package while it is on the vehicle.

Cargo Heater Rules. There are special cargo heater rules for loading:
- Class 1 (Explosives);
- Class 2.1 (Flammable Gas);
- Class 3 (Flammable Liquids).

Subsections 9.1, 9.2, and 9.3 Test Your Knowledge

1. Shippers package in order to (fill in the blank) the material.
2. Drivers placard their vehicle to (fill in the blank) the risk.
3. What three things do you need to know to decide which placards (if any) you need?
4. A hazardous materials identification number must appear on the (fill in the blank) and on the (fill in the blank). The identification number must also appear on cargo tanks and other bulk packaging.
5. Where must you keep shipping papers describing hazardous materials?

These questions may be on your test. If you can't answer them all, reread subsections 9.1, 9.2 and 9.3.
Use Closed Cargo Space. You cannot have overhang or tailgate loads of:
- Class 1 (Explosives);
- Class 4 (Flammable Solids); and
- Class 5 (Oxidizers).

You must load these hazardous materials into a closed cargo space unless all packages are:
- Fire and water resistant;
- Covered with a fire and water resistant tarp.

Precautions for Specific Hazards
Class 1 (Explosives) Materials. Turn your engine off before loading or unloading any explosives. Then check the cargo space. You must:
- Disable your brakes. Disconnect heater power sources and drain heater fuel tanks;
- Make sure there are no sharp points that might damage cargo. Look for bolts, screws, nails, broken side panels, and broken floorboards; and
- Use a floor lining with Division 1.1, 1.2, or 1.3 (Class A or B Explosives). The floors must be tight and the liner must be either non-metallic material or non-ferrous metal.

Use extra care to protect explosives. Never use hooks or other metal tools. Never drop, throw, or roll packages. Protect explosive packages from other cargo that might cause damage.

Do not transfer a Division 1.1, 1.2, or 1.3 (Class A or B Explosive) from one vehicle to another on a public roadway except in an emergency. If safety requires an emergency transfer, set out red warning reflectors, flags, or electric lanterns. You must warn others on the road.

Never transport damaged packages of explosives. Do not take a package that shows any dampness or oily stain. Load charged storage batteries so their liquid won't spill. Keep them right side up. Make sure other cargo won't fall against or short circuit them.

Never load corrosive liquids next to or above:
- Division 1.4 (Explosives C);
- Division 4.1 (Flammable Solids);
- Division 4.3 (Dangerous When Wet);
- Class 5 (Oxidizers); or
- Division 2.3, Zone B (Poisonous Gases).

Never load corrosive liquids with:
- Division 1.1 or 1.2 (Explosives A);
- Division 1.2 or 1.3 (Explosives B);
- Division 1.5 (Blasting Agents);
- Division 2.3, Zone A (Poisonous Gases); and
- Division 6.2 (Spontaneously Combustible Materials).

Class 2 (Compressed Gases) Including Cryogenic Liquids. If your vehicle doesn't have racks to hold cylinders, the cargo space floor must be flat. The cylinders must be:
- Held upright; and
- In racks attached to the vehicle or in boxes that will keep them from turning over.

Cylinders may be loaded in a horizontal position (lying down) if it is designed so the relief valve is in the vapor space.

Division 2.3 (Poisonous Gas) or Division 6.1 (Poisonous Materials). Never transport these materials in containers with interconnections. Never load a package labeled POISON or POISON INHALATION HAZARD in the driver's cab or sleeper or with food material for human or animal consumption. There are special rules for loading and unloading Class 2 materials in cargo tanks. You must have special training to do this.

Class 7 (Radioactive) Materials. Some packages of Class 7 (Radioactive) materials bear a number called the "transport index." The shipper labels these packages Radioactive II or Radioactive III, and prints the package's transport index on the label. Radiation surrounds each package, passing through all nearby packages. To deal with this problem, the number of packages you can load together is controlled. Their closeness to people, animals, and unexposed film is also controlled. The transport index tells the degree of control needed during transportation. The total transport index of all packages in a single vehicle must not exceed 50. Table A to this section shows rules for each transport index. It shows how close you can load Class 7 (Radioactive) materials to people, animals, or film. For example, you can't leave a package with a transport index of 1.1 within two feet of people or cargo space walls.

Section 9 — Hazardous Materials

9.5.1 — Markings

You must display the identification number of the hazardous materials in portables and cargo tanks and other bulk packaging (such as dump trucks). Identification numbers are in column 4 of the Hazardous Materials Table. The rules require black 100 mm (3.9 inch) numbers on orange panels, placards, or a white, diamond-shaped background if no placards are required. Specification cargo tanks must show re-test date markings.

Portable tanks must also show the lessee or owner's name. They must also display the shipping name of the contents on two opposing sides. The height of the shipping name must be at least two inches tall on portable tanks with capacities of more than 1,000 gallons and one-inch tall on portable tanks with capacities of less than 1,000 gallons. The identification number must appear on each side and each end of a portable tank or other bulk packaging that hold 1,080 gallons or more and on two opposing sides, if

Table A to this section shows rules for each transport index.
9.6 – Hazardous Materials — Driving and Parking Rules

9.6.1 – Parking with Division 1.1, 1.2, or 1.3 (Class A or B) Explosives

Never park with Division 1.1, 1.2, or 1.3 (Class A or B) explosives within five feet of the traveled part of the road. Except for short periods of time needed for vehicle operation necessities (e.g., fueling), do not park within 300 feet of:

- A bridge, tunnel, or building;
- A place where people gather, or
- An open fire.

If you must park to do your job, do so only briefly.

Don’t park on private property unless the owner is aware of the danger. Someone must always watch the parked vehicle. You may let someone else watch it for you only if your vehicle is:

- On the shipper’s property;
- On the carrier’s property; or
- On the consignee’s property.

You are allowed to leave your vehicle unattended in a safe haven. A safe haven is an approved place for parking unattended vehicles loaded with explosives. Designation of authorized safe havens is usually made by local authorities.

9.6.2 – Parking a Placedard Vehicle Not Transporting Division 1.1, 1.2, or 1.3 (Class A or B) Explosives

You may park a placedard vehicle (not laden with explosives) within five feet of the traveled part of the road only if your work requires it. Do so only briefly. Someone must always watch the vehicle when parked on a public roadway or shoulder. Do not uncouple a trailer and leave it with hazardous materials on a public street. Do not park within 300 feet of an open fire.

9.6.3 – Attending Placedard Vehicles

The person attending a placedard vehicle must:

- Be in the vehicle, and not in the sleeper berth, or
- Be within 5 feet of the vehicle and have it within clear view.
- Be aware of the hazards of the materials being transported.
- Know what to do in emergencies; and
- Be able to move the vehicle, if needed.

9.6.4 – No Flares!

You might break down and have to use stopped vehicle signals. Use reflective triangles or red electric lights. Never use burning signals, such as flares or fuses, around a:

- Tank used for Class 3 (Flammable Liquids) or Division 2.1 (Flammable Gas) whether loaded or empty; or
- Vehicle loaded with Division 1.1, 1.2, or 1.3 (Class A or B) Explosives.

9.6.5 – Route Restrictions

Some states and counties require permits to transport hazardous materials. They may limit the routes you can use. Local rules about routes and permits change often. It is your job as driver to find out if you need permits or must use special routes. Make sure you have all needed papers before starting.

If you work for a carrier, ask your dispatcher about route restrictions or permits. If you are an independent trucker and are planning a new route, check with state agencies where you plan to travel. Some localities prohibit transportation of hazardous materials through tunnels, over bridges, or other roadways. Check before you start.

Whenever placarded, avoid heavily populated areas, crowds, tunnels, narrow streets, and alleys. Take other routes, even if inconvenient, unless there is no other way. Never drive a placedard vehicle near open fires unless you can safely pass without stopping.

If transporting Division 1.1, 1.2, or 1.3 (Class A or B) explosives, you must have a written route plan and follow that plan. Carriers prepare the route plan in advance and give the driver a copy. You may plan the route yourself if you pick up the explosives at a location other than your employer’s terminal. Write out the plan in advance. Keep a copy of it with you while transporting the explosives. Deliver shipments of explosives only to authorized persons or leave them in locked rooms designed for explosives storage. A carrier must choose the safest route to transport placarded radioactive materials. After choosing the route, the carrier must tell the driver about the radioactive materials, and show the route plan.

9.6.6 – No Smoking

Do not smoke within 25 feet of a placedard cargo tank used for Class 3 (flammable liquids) or Division 2.1 (gases). Also, do not smoke or carry a lighted cigarette, cigar, or pipe within 25 feet of any vehicle, which contains:

- Class 1 (Explosives);
- Class 3 (Flammable Liquids);
- Class 4 (Flammable Solids); or
- Class 5 (Oxidizers).

9.6.7 – Refuel with Engine Off

Turn off your engine before fueling a motor vehicle containing hazardous materials. Someone must always be at the nozzle, controlling fuel flow.

9.6.8 – 10 B:C Fire Extinguisher

The power unit of placedard vehicles must have a fire extinguisher with a UL rating of 10 B:C or more.

9.6.9 – Check Tires

Make sure your tires are properly inflated. Check placedard vehicles with dual tires at the start of each trip and when you park. You must check the tires each time you stop. The only acceptable way to check tire pressure is to use a tire pressure gauge. Do not drive with a tire that is leaking or flat except to the nearest safe place to fix it. Remove any overheated tire. Place it a safe distance from your vehicle. Don’t drive until you correct the cause of the overheating. Remember to follow the rules about parking placedard vehicles. They apply even when checking, repairing, or replacing tires.

9.6.10 – Where to Keep Shipping Papers and Emergency Response Information

Do not accept a hazardous materials shipment without a properly prepared shipping paper. A shipping paper for hazardous materials must always be easily recognized. Other people must be able to find it quickly after an accident. Clearly distinguish hazardous materials shipping papers from others by tabbing them or keeping them on top of the stack of papers.

When you are behind the wheel, keep shipping papers within your reach (with your seat belt on), or in a pouch on the driver’s door. They must be easily seen by someone entering the cab.

When not behind the wheel, leave shipping papers in the driver’s door pouch or on the driver’s seat. Emergency response information must be kept in the same location as the shipping paper.

Include papers for Division 1.1, 1.2, or 1.3 (Class A or B) explosives. A carrier must give each driver transporting Division 1.1, 1.2, or 1.3 (Class A or B) explosives a copy of Federal Motor Carrier Safety Regulations (FMCSR), Part 397. The carrier must also give written instructions on what to do if delayed or in an crash. The written instructions must include:

- The names and telephone numbers of people to contact (including carrier agents or shippers);
- The nature of the explosives transported; and
- The amount of the explosives transported.
The precautions to take in emergencies such as fires, crashes, or leaks. Drivers must sign a receipt for these documents, and have in their possession while driving, the:
- Shipping papers,
- Written emergency instructions;
- Written route plan; and
- A copy of FMCSR, Part 397.

9.6.11 – Equipment for Chlorine
A carrier and emergency in cargo tanks must have an approved gas mask in the vehicle. The driver must also have an emergency kit for controlling leaks in dome cover plate fittings on the cargo tank.

9.6.12 – Stop Before Railroad Crossings
Stop before a railroad crossing if your vehicle:
- Is loaded with cargo;
- Carries any amount of chlorine;
- Has cargo tanks, whether loaded or empty used for hazardous materials.
You must stop 15 to 50 feet before the nearest rail. Proceed only when you are sure no train is coming. Don’t shift gears while crossing the tracks.

9.7 – Hazardous Materials - Emergencies

9.7.1 – Emergency Response Guidebook (ERG)
The Department of Transportation has a guidebook for firefighters, police, and industry workers on how to protect themselves and the public from hazardous materials. The guide is indexed by proper shipping name and hazardous materials identification number. Emergency personnel look for these things on the shipping paper. That is why it is vital that the proper shipping name, identification number, label, and placards are correct.

9.7.2 – Flames

9.7.3 – Fires
You might have to control minor truck fires on the road. However, unless you have the training and equipment to do so safely, don’t fight hazardous materials fires. Dealing with hazardous materials fires requires special training and protective gear.

When you discover a fire, send for help. You may use the fire extinguisher to keep minor truck fires from spread-

ing to cargo before firefighters arrive. Feel trailer doors to see if they are hot before opening them. If hot, you may have a fire cargo and should not open the doors. Opening doors lets air in and may make the fire flare up. Without air, many fires only smolder until firemen arrive, doing less damage. If your cargo is already on fire, it is not safe to fight the fire. Keep the shipping papers with you to give to emergency personnel as soon as they arrive. Warn other people of the danger and keep them away.

If you discover a cargo leak, identify the hazardous mate-
rials leaking by using shipping papers, labels, or package location. Do not touch any leaking material—many people injure themselves by touching hazardous materials. Do not try to identify the material or find the source of a leak by smell. Toxic gases can destroy your sense of smell and can injure or kill you even if they don’t smell. Never eat, drink, or smoke around a leak or spill.

If hazardous materials are spilling from your vehicle, do not move it any more than safety requires. You may move off the road and away from places where people gather, if doing so serves safety. Only move your vehicle if you can do so without danger to yourself or others.

Never continue driving with hazardous materials leaking from your vehicle in order to find a phone booth, truck stop, help, or similar reason. Remember, the carrier pays for the cleanup of contaminated parking lots, roadways, and drainage ditches. Take care of things properly and do not leave a lengthy trail of contamination. If hazardous materi-
als are spilling from your vehicle:
- Park it;
- Secure the area;
- Stay there;
- Send someone else for help.

When sending someone for help, give that person:
- A description of the emergency;
- Your exact location and direction of travel;
- Your name, the carrier’s name, and the name of the community or city where your terminal is located; and
- The proper shipping name, hazard class, and identifica-
tion number of the hazardous materials, if you know them.

This is a lot for someone to remember. It is a good idea to write it all down for the person you send for help. The emergency response team must know these things to find you and to handle the emergency. They may have to travel miles to get to you. This information will help them to bring the right equipment the first time, without having to go back for it.

Never move your vehicle, if doing so would cause contamin-
ation or damage the vehicle. Keep downwind and away from roadside rest areas, truck stops, cafes, and businesses.

Never try to repack leaking containers. Unless you have the training and equipment to repair leaks safely, don’t try it. Call your dispatcher or supervisor for instructions and, if needed, emergency personnel.

9.7.4 – Responses to Specific Hazards

Class 1 (Explosives).
If your vehicle has a breakdown or crash while carrying explosives, warn others of the danger. Keep bystanders away. Do not allow smoking or open fire near the vehicle. If there is a fire, warn everyone of the danger of explosion.

Remove all explosives before separating vehicles involved in a collision. Place the explosives at least 200 feet from the vehicles and occupied buildings. Stay a safe distance away.

Class 2 (Compressed Gases).
If compressed gas is leaking from your vehicle, warn oth-
ers of the danger. Only permit those involved in removing the hazard or wreckage to get close. You must notify the shipper if compressed gas is involved in any crash.

If you are feeling machinery used in road con-
struction or maintenance, do not transfer a flammable compressed gas from one tank to another on any public roadway.

Class 3 (Flammable Liquids).
If you are transporting a flammable liquid and have a crash or vehicle breaks down, prevent bystanders from gathering. Warn people of the danger. Keep them from smoking.

Never transport a leaking cargo tank farther than needed to reach a safe place. Get off the roadway if you can do so safely. Don’t transfer flammable liquid from one vehicle to another on a public roadway except in an emergency.

Class 4 (Flammable Solids) and Class 5 (Oxidizing Materials).
If flammable solids or oxidizing materials spill, warn oth-
ers of the fire hazard. Do not open smoldering packages of flammable solids. Remove them from the vehicle if you can safely do so. Also, remove unbroken packages if it will decrease the fire hazard.

Class 6 (Poisonous Materials and Infectious Substances).
It is your job to protect yourself, other people, and prop-
erty from harm. Remember that many products classed as poison are also flammable. If you think a Division 2.3 (Poison Gases) or Division 6.1 (Poison Materials) might be flammable, take the added precautions needed for flammable liquids or gases. Do not allow smoking, open flame, or welding. Warn others of the hazards of fire, of inhaling vapors, or coming in contact with the poison.

A vehicle involved in a leak of Division 2.3 (Poison Gases) or Division 6.1 (Poison Materials) must be checked for stray poison before being used again.

If a Division 6.2 (Infectious Substances) package is dam-
aged in handling or transportation, you should immedi-
ately contact your supervisor. Packages that appear to be damaged or show signs of leakage should not be accepted.

Class 7 (Radioactive Materials).
If radioactive material is involved in a leak or broken pack-
tage, tell your dispatcher or supervisor as soon as possible.

If there is a spill, or if an internal container might be dam-
aged, do not touch or inhale the material. Do not use the vehicle until it is cleaned and checked with a survey meter.

Class 8 (Corrosive Materials).
If corrosives spill or leak during transportation, be careful to avoid further damage or injury when handling the con-
tainers. Parts of the vehicle exposed to a corrosive liquid must be thoroughly washed with water. After unloading, wash out the interior as soon as possible before reloading.

If continuing to transport a leaking tank would be unsafe, get off the road. If safe to do so, contain any liquid leaking from the vehicle. Keep bystanders away from the liquid and its fumes. Do everything possible to prevent injury to yourself and to others.

9.7.5 – Required Notification

The National Response Center has a five-digit national or damage the vehicle. Keep downwind and away from roadside rests, truck stops, cafes, and businesses.
When appropriate, call either one; they will tell the other about the problem of hazardous materials. The National Response Center with technical information about the physical properties CHEMTREC was created to provide emergency personnel with more information. Carriers must make detailed written reports within 30 days of an incident. Be prepared to give your employer the required information as well. Carriers must make detailed written reports within 30 days of an incident.

CHEMTREC

The Chemical Transportation Emergency Center (CHEMTREC) in Washington also has a 24-hour toll-free line. CHEMTREC was created to provide emergency personnel with technical information about the physical properties of hazardous materials. The National Response Center and CHEMTREC are in close communication. If you call either one, they will tell the other about the problem when appropriate.

Table A

Radioactive Separation

<table>
<thead>
<tr>
<th>TOTAL TRANSPORT</th>
<th>MINIMUM DISTANCE IN FEET TO NEAREST UNDEVELOPED FILM</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDEX</td>
<td>0-2 Hrs.</td>
</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>0.1 to 1.0</td>
<td>1</td>
</tr>
<tr>
<td>1.1 to 5.0</td>
<td>3</td>
</tr>
<tr>
<td>5.1 to 10.0</td>
<td>6</td>
</tr>
<tr>
<td>10.1 to 20.0</td>
<td>5</td>
</tr>
<tr>
<td>20.1 to 30.0</td>
<td>7</td>
</tr>
<tr>
<td>30.1 to 40.0</td>
<td>8</td>
</tr>
<tr>
<td>40.1 to 50.0</td>
<td>9</td>
</tr>
</tbody>
</table>

Figure 9.10

Do not leave radioactive yellow - II or yellow - III labeled packages near people, animals, or film longer than shown in Figure 9.10.

Table B

Hazard Class Definitions

<table>
<thead>
<tr>
<th>Class</th>
<th>Class Name</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Explosives</td>
<td>Ammunition, Dynamite, Fireworks</td>
</tr>
<tr>
<td>2</td>
<td>Gases</td>
<td>Propane, Oxygen, Helium</td>
</tr>
<tr>
<td>3</td>
<td>Flammable</td>
<td>Gasoline Fuel, Acetone</td>
</tr>
<tr>
<td>4</td>
<td>Flammable Solids</td>
<td>Matches, Fuses</td>
</tr>
<tr>
<td>5</td>
<td>Oxidizers</td>
<td>Ammonium Nitrate, Hydrogen Peroxide</td>
</tr>
<tr>
<td>6</td>
<td>Poisons</td>
<td>Pesticides, Arsenic</td>
</tr>
<tr>
<td>7</td>
<td>Radioactive</td>
<td>Uranium, Plutonium</td>
</tr>
<tr>
<td>8</td>
<td>Corrosives</td>
<td>Hydrochloric Acid, Battery Acid</td>
</tr>
<tr>
<td>9</td>
<td>Miscellaneous Hazardous Materials</td>
<td>Formaldehyde, Asbestos</td>
</tr>
<tr>
<td>None</td>
<td>ORM-D (Other Regulated Material-Domestic)</td>
<td>Hair Spray or Charcoal</td>
</tr>
</tbody>
</table>

Figure 9.11

9.8 – Hazardous Materials Glossary

This glossary presents definitions of certain terms used in this section. A complete glossary of terms can be found in the federal Hazardous Materials Rules (49 CFR 171.8). You should have an up-to-date copy of these rules for your reference.

Classes of Hazardous Materials

Hazardous materials are categorized into nine major hazard classes and additional categories for consumer commodities and combustible liquids. The classes of hazardous materials are listed in Figure 9.12.

Hazard class – A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials and materials designated as hazardous in the hazardous materials table of §172.101, and materials that meet the defining criteria for hazard classes and divisions in §173, subchapter c of this chapter.

Hazardous substances – A material, including its mixtures and solutions, that:

- Is listed in Appendix A to Sec. 172.101;
- Is in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) listed in Appendix A to Sec. 172.101; and
- When in a mixture or solution.
This definition does not apply to petroleum products that are lubricants or fuels (see 40 CFR 300.6).

Hazardous waste – For the purposes of this chapter, means any material that is subject to the Hazardous Waste Manifest Requirements of the U.S. Environmental Protection Agency specified in 40 CFR Part 262.

Intermediate bulk container (IBC) – A rigid or flexible portable packaging, other than a cylinder or portable tank, which is designed for mechanical handling. Standards for IBCs manufactured in the United States are set forth in subparts N and O §178.

Limited quantity – The maximum amount of a hazardous material for which there may be specific labeling or packaging exception.

Marking – The descriptive name, identification number, instructions, cautions, weight, specification, or UN marks or combinations thereof, required by this subchapter on outer packaging of hazardous materials.

Mixture – A material composed of more than one chemical compound or element.

Name of contents – The proper shipping name as specified in Sec. 172.101.

Non-bulk packaging – A packaging, which has:
- A maximum capacity of 450 L (119 gallons) as a receptacle for a liquid;
- A maximum net mass less than 400 kg (882 pounds) and a maximum capacity of 450 L (119 gallons) or less as a receptacle for a solid; or
- A water capacity greater than 454 kg (1,000 pounds) or less as a receptacle for a gas as defined in Sec. 173.115.

N.O.S. – Not otherwise specified.

Outage or ullage – The amount by which a packaging falls short of being liquid full, usually expressed in percent by volume.

Portable tank – Bulk packaging (except a cylinder having a water capacity of 1,000 pounds or less) designed primarily to be loaded onto, or on, or temporarily attached to a transport vehicle or ship and equipped with skids, mountings, or accessories to facilitate handling of the tank by mechanical means. It does not include a cargo tank, tank car, multi-unit tank car tank, or trailer carrying 3AX, 3AAX, or 3T cylinders.

Proper shipping name – The name of the hazardous materials shown in Roman print (not italics) in Sec. 172.101.

PSI or psi – Pounds per square inch.

PSI or psia – Pounds per square inch absolute.

Reportable quantity (RQ) – The quantity specified in Column 2 of the Appendix to Sec. 172.101 for any material identified in Column 1 of the Appendix.

RSPA – The Research and Special Programs Administration, U.S. Department of Transportation, Washington, DC 20590.

Shipper’s certification – A statement on a shipping paper, signed by the shipper, saying he/she prepared the shipment properly according to law. For example:

“This is to certify that the above named materials are properly classified, described, packed, marked and labeled, and are in proper condition for transportation according to the applicable regulations or the Department of Transportation” or

“It hereby declares that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packed, marked and labeled/packaged, and are in all respects in proper condition for transport by... according to applicable international and national government regulations.”

words may be inserted here to indicate mode of transportation (rail, aircraft, motor vehicle, vessel).

Shipping paper – A shipping order, bill of lading, manifest, or other shipping document serving a similar purpose and containing the information required by Sec. 172.202, 172.203, and 172.204.

Technical name – A recognized chemical name or micro-biological name currently used in scientific and technical handbooks, journals, and texts.

Transport vehicle – A cargo-carrying vehicle such as an automobile, van, tractor, truck, semi-trailer, tank car, or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, rail car, etc.) is a separate transport vehicle.

UN standard packaging – A specification packaging conforming to the standards in the UN recommendations. UN – United Nations.

Table 10.1

<table>
<thead>
<tr>
<th>Hazardous Substance Concentrations</th>
<th>Concentration by Weight</th>
<th>PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100,000</td>
<td></td>
</tr>
<tr>
<td>5,000 (2,270)</td>
<td>2</td>
<td>20,000</td>
</tr>
<tr>
<td>1,000 (45)</td>
<td>2</td>
<td>2,000</td>
</tr>
<tr>
<td>100 (45.4)</td>
<td>.02</td>
<td>200</td>
</tr>
<tr>
<td>10 (4.54)</td>
<td>.002</td>
<td>20</td>
</tr>
</tbody>
</table>

Figure 10.12

10.1 – Danger Zones and Use of Mirrors

10.1.1 – Danger Zones

The danger zone is the area on all sides of the bus where children are in the most danger of being hit, either by another vehicle or their own bus. The danger zones may extend as much as 30 feet from the front bumper with the first 10 feet being the most dangerous, 10 feet from the left and right sides of the bus and 10 feet behind the rear bumper of the school bus. In addition, the area to the left of the bus is always considered dangerous because of passing cars. Figure 16.1 illustrates these danger zones.

10.1.2 – Correct Mirror Adjustment

Proper adjustment and use of all mirrors is vital to the safe operation of the school bus in order to observe the danger zone around the bus and effectively look for students, traffic and other objects in this area. You should always check each mirror before operating the school bus to obtain maximum viewing area. If necessary, have the mirrors adjusted.

10.1.3 – Outside Left and Right Side Flat Mirrors

These mirrors are mounted at the left and right front corners of the bus at the side or front of the windshield. They are used to monitor traffic, check clearances and students on the sides and to the rear of the bus. There is a blind spot immediately below and in front of each mirror and directly in back of the rear bumper. The blind spot behind the bus extends 50 to 150 feet and could extend up to 400 feet depending on the length and width of the bus.

10.1.4 – Danger from Passing Cars

Ensure that the mirrors are properly adjusted so you can see:
- 200 feet or 4 bus lengths behind the bus,
- Along the sides of the bus,
- The rear tires touching the ground.

Figure 10.2 shows how both the outside left and right side flat mirrors should be adjusted.
The convex mirrors are located below the outside flat mirrors. They are used to monitor the left and right sides at a wide angle. They provide a view of traffic, clearances, and students at the side of the bus. These mirrors present a view of people and objects that does not accurately reflect their size and distance from the bus.

You should position these mirrors to see:
- The entire side of the bus up to the mirror mounts;
- Front of the rear tires touching the ground; and
- At least one traffic lane on either side of the bus.

Figure 10.3 shows how both the outside left and right side convex mirrors should be adjusted.

10.1.5 – Outside Left and Right Side Crossover Mirrors

These mirrors are mounted on both left and right front corners of the bus. They are used to see the front bumper “danger zone” area directly in front of the bus that is not visible by direct vision, and to view the “danger zone” area to the left side and right side of the bus, including the service door and front wheel area.

Ensure that the mirrors are properly adjusted so you can see:
- The entire area in front of the bus from the front bumper at ground level to a point where direct vision is possible. Direct vision and mirror view should overlap;
- The right and left front tires touching the ground, and
- The area from the front of the bus to the service door. These mirrors, along with the convex and flat mirrors, should be viewed in a logical sequence to ensure that a child or object is not in any of the danger zones.

Figure 10.3 illustrates how the left and right side crossover mirrors should be adjusted.

10.1.6 – Overhead Inside Rearview Mirror

This mirror is mounted directly above the windshield on the driver’s side area of the bus. This mirror is used to monitor passenger activity inside the bus. It may provide limited visibility directly in back of the bus if the bus is equipped with a glass-bottomed rear emergency door. There is a blind spot area directly behind the driver’s seat as well as a large blind spot area that begins at the rear bumper and could extend up to 400 feet or more behind the bus. You must use the exterior side mirrors to monitor traffic that approaches and enters this area.

You should position the mirror to see:
- The top of the rear window in the top of the mirror;
- All of the students, including the heads of the students right behind you.

10.2 – Loading and Unloading

More students are killed while getting on or off a school bus each year than are killed as passengers inside of a school bus. As a result, knowing what to do before, during, and after loading or unloading students is critical. This section will give you specific procedures to help you avoid unsafe conditions which could result in injuries and fatalities during and after loading and unloading students. It is imperative that you learn and obey Wyoming laws and regulations governing loading/unloading operations.

10.2.1 – Approaching the Stop

Each school district establishes official routes and official school bus stops. All stops should be approved by the school district prior to making the stop. You should never change the location of a bus stop without written approval from the appropriate school district official.

You must use extreme caution when approaching a school bus stop. You are in a very demanding situation when entering these areas. It is critical that you understand and follow all state and local laws and regulations regarding approaching a school bus stop. This would involve the proper use of mirrors, alternating flashing lights, and when equipped, the moveable stop signal arm and crossing control arm.

When approaching the stop, you should:
- Approach cautiously at a slow rate of speed;
- Look for pedestrians, traffic, or other objects before, during, and after coming to a stop;
- Continuously check all mirrors;
- If the school bus is so equipped, activate alternating flashing amber warning lights 100-500 feet or approximately 5-10 seconds before the school bus stop or in accordance with W.S. 31-5-928(b);
- Turn on right turn signal indicator about 100-300 feet or approximately 5-5 seconds before pulling over;
- Continuously check mirrors to monitor the danger zones for students, traffic, and other objects;
- Move as far as possible to the right on the traveled portion of the roadway in accordance with W.S. 31-5-507(b);
- Bring school bus to a full stop with the front bumper at least 10 feet away from students at the designated stop. This forces the students to walk to the bus so you have a better view of their movements;
- Place transmission in Park, or if there is no Park shift lever, the moveable stop signal arm and cross control arm;
- When all students are accounted for, prepare to leave by:
  - Closing the door;
  - Engaging transmission;
  - Releasing the parking brake;
  - Turning off alternating flashing red lights;
  - Turning on left turn signal;
  - Allowing congested traffic to disperse;
  - When it is safe, move the bus to enter traffic flow and continue the route.

The loading procedure is essentially the same wherever you load students, but there are slight differences. When students are loading at the school campus, you should:
- Turn off the ignition switch;
- Remove key if leaving driver's compartment; and
- Position yourself to supervise loading as required or recommended by your state or local regulations.

10.2.2 – Loading Procedures

Perform a safe stop as described in subsection 10.2.1.

When it is safe, move the bus to enter traffic flow and continue the route.

Count the number of students at the bus stop and be sure all board the bus. If possible, know names of students at each stop. If there is a student missing, ask the other students where the student is.

Have the students board the school bus slowly, in single file, and use the handrail. The dome light should be on while loading in the dark;

Wait until students are seated and facing forward before moving the bus;

Check all mirrors. Make certain no one is running to catch the bus;

If you cannot account for a student outside, secure the bus, take the key, and check around and underneath the bus;

When all students are accounted for, prepare to leave by:
- Closing the door;
- Engaging transmission;
- Releasing the parking brake;
- Turning off alternating flashing red lights;
- Turning on left turn signal;
- Allowing congested traffic to disperse;
- When it is safe, move the bus to enter traffic flow and continue the route.

The loading procedure is essentially the same wherever you load students, but there are slight differences. When students are loading at the school campus, you should:
- Turn off the ignition switch;
- Remove key if leaving driver's compartment; and
- Position yourself to supervise loading as required or recommended by your state or local regulations.
Secure the bus by:

- Position yourself to supervise unloading as required or recommended by Wyoming or local district regulations.
- Have students exit in orderly fashion.
- Observe students as they step from bus to see that all move promptly away from the unloading area.
- Walk through the bus and check for hiding/sleeping students and items left by students.
- Check all mirrors. Make certain no students are returning to the bus.
- If you cannot account for a student outside the bus and the bus is secure, check around and underneath the bus.
- When all students are accounted for, prepare to leave by:
  - Closing the door;
  - Fastening safety belt;
  - Starting engine;
  - Engaging the transmission;
  - Releasing the parking brake;
  - Turning off alternating flashing red lights;
  - Turning on left turn signal;
  - Checking all mirrors again; and
  - Allowing congested traffic to disperse;

When it is safe, pull away from the unloading area.

10.2.5 – Special Dangers of Loading and Unloading

Dropped or Forgotten Objects. Always focus on students as they approach the bus and watch for any who disappear from sight.

Students may drop an object near the bus during loading and unloading. Stopping to pick up the object, or returning to pick up the object may cause the student to disappear from the driver’s sight at a very dangerous moment.

Students should be told to leave any dropped object and move to a point of safety out of the danger zones and attempt to get the driver’s attention to retrieve the object.

Handrail Hang-ups. Students have been injured or killed when clothing, accessories, or even parts of their body got caught in the handrail or door as they exited the bus. You should closely observe all students exiting the bus to confirm that they are in a safe location prior to moving the bus.

10.2.6 – Post-trip Inspection

When your route or school activity trip is finished, you should conduct a post-trip inspection of the bus.

You should walk through the bus and around the bus looking for the following:

- Articles left on the bus;
- Sleeping students;
- Open windows and doors;
- Mechanical/operational problems with the bus, with special attention to items that are unique to school buses — mirror systems, flashing warning lamps and stop signal arms; and
- Damage or vandalism.

Any problems or special situations should be reported immediately to your supervisor or school authorities.

10.3 – Emergency Exit and Evacuation

An emergency situation can happen to anyone, anytime, anywhere. It could be a crashed, stalled school bus on a railroad-highway crossing or in a high-speed intersection, an electrical fire in the engine compartment, a medical emergency to a student on the school bus, etc. Knowing what to do in an emergency — before, during and after an evacuation — can mean the difference between life and death.

10.3.1 – Planning for Emergencies

Determine Need to Evacuate Bus. The first and most important consideration is for you to recognize the hazard. If time permits, school bus drivers should contact their dispatcher to explain the situation before making a decision to evacuate the school bus.

As a general rule, student safety and control is best maintained by keeping students on the bus during an emergency and/or impending crisis situation, if doing so does not expose students to unnecessary risk or injury. Remember, the decision to evacuate the bus must be a timely one.

A decision to evacuate should include consideration of the following conditions:

- Is there a fire or danger of fire?
- Is there a smell of raw or leaking fuel?
- Is there a chance the bus could be hit by other vehicles?
- Is the bus in the path of a sighted tornado or rising waters?
- Are there drowned power lines?
- Would removing students expose them to speeding traffic, severe weather, or a dangerous environment such as drowned power lines?
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A safe place will be at least 100 feet off the road in the direction of oncoming traffic. This will keep the students from being hit by debris if another vehicle collides with the bus.

- Lead students upwind of the bus if fire is present;
- Lead students as far away from railroad tracks as possible in the direction of any oncoming train;
- Lead students upwind of the bus at least 300 feet if there is a risk from spilled hazardous materials;

If the bus is in the direct path of a sighted tornado and evacuation is ordered, escort students to a nearby ditch or culvert if shelter in a building is not readily available, and direct them to lie face down, hands covering their head. They should be far enough away so the bus cannot topple on them. Avoid areas that are subject to flash floods.

General Procedures. Determine if evacuation is in the best interest of safety.

- Determine the best type of evacuation:
  - Front, rear or side door evacuation, or some combination of doors;
  - Roof or window evacuation;

- Secure the bus by:
  - Placing transmission in Park, or if there is no shift point, in Neutral;
  - Setting parking brakes;
  - Shutting off the engine;
  - Removing ignition keys; and
  - Activating hazard-warning lights;

- If time allows, notify dispatch office of evacuation location, conditions, and type of assistance needed;

- Radio or telephone call to the school office;

- Dangle radio microphone or telephone out of driver’s window for later use, if operable;

- If no radio, or radio is inoperable, dispatch a passing motorist, resident or any other individual

- If no radio, or radio is inoperable, dispatch a passing motorist, resident or any other individual

- Dispatch two or more, responsible students to go for help;

- Order the evacuation;

- Evacuate students from the bus;

- Do not move a student you believe may have suffered a neck or spinal injury unless he or her life is in immediate danger;

- Special procedures must be used to move neck/spinal injury victims to prevent further injury;

- Direct a student assistant to lead students to the nearest safe place;

- Be Prepared and Plan Ahead. When possible, assign two responsible, older student assistants to each emergency exit. Teach them how to assist the other student off the bus. Assign another student assistant to lead the students to a “safe place” after evacuation. However, you must recognize that there may not be older, responsible students on the bus at the time of the emergency. Therefore, emergency evacuation procedures must be explained to students in advance showing how to operate the various emergency exits and the importance of listening to and following all instructions given by you.

Some tips to determine a safe place:

- A safe place will be at least 100 feet off the road in the direction of oncoming traffic. This will keep the students from being hit by debris if another vehicle collides with the bus;
- Lead students upwind of the bus if fire is present;
- Lead students as far away from railroad tracks as possible in the direction of any oncoming train;
- Lead students upwind of the bus at least 300 feet if there is a risk from spilled hazardous materials;
- If the bus is in the direct path of a sighted tornado and evacuation is ordered, escort students to a nearby ditch or culvert if shelter in a building is not readily available, and direct them to lie face down, hands covering their head. They should be far enough away so the bus cannot topple on them. Avoid areas that are subject to flash floods.

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- Special procedures must be used to move neck/spinal injury victims to prevent further injury;

- Direct a student assistant to lead students to the nearest safe place;
Walk through the bus to ensure no students remain on the bus. Retrieve emergency equipment;

Join waiting students. Account for all students and check for their safety;

Protect the scene. Set out emergency warning devices as necessary;

Prepare information for emergency responders.

10.4 – Railroad-highway Crossings

10.4.1 – Types of Crossings

Passive Crossings. This type of crossing does not have any type of traffic control device. You must stop at these crossings and follow proper procedures. However, the decision to proceed rests entirely in your hands. Passive crossings require you to recognize the crossing, search for any train using the tracks and decide if there is sufficient clear space to cross safely. Passive crossings have yellow circular advance warning signs, pavement markings and crossbucks to assist you in recognizing a crossing.

Active Crossings. This type of crossing has a traffic control device installed at the crossing to regulate traffic at the crossing. These active devices include flashing red lights, with or without bells and flashing red lights with bells and gates.

10.4.2 – Warning Signs and Devices

Advance Warning Signs. The round, black-on-yellow warning sign is placed ahead of a public railroad-highway crossing. The advance warning sign tells you to slow down, look and listen for the train, and be prepared to stop at the crossing. See Figure 10.5.

10.4.3 – Recommended Procedures

Wyoming has laws and regulations governing how school buses must operate at railroad-highway crossings. It is important for you to understand and obey state laws and regulations. In general, school buses must stop at all crossings, and ensure it is safe before proceeding across the tracks. You should familiarize yourself with Wyoming statutes and local district regulations regarding railroad-highway crossings.

A school bus is one of the safest vehicles on the highway. However, a school bus does not have the slightest edge when involved in a crash with a train. Because of a train’s size and weight it cannot stop quickly. An emergency escape route does not exist for a train. You can prevent school bus/train crashes by following these recommended procedures;

10.4.4 – Special Situations

Bus Stalls or Trapped on Tracks. If your bus stalls or is trapped on the tracks, get everyone out and off the tracks immediately. Move everyone far from the bus at an angle, which is both away from the tracks and toward the roadway. Police Officer at the Crossing. If a police officer is at the crossing, obey directions. If there is no police officer, and you believe the signal is malfunctioning, call your dispatcher to report the situation and ask for instructions on how to proceed.

Obstructed View of Tracks. Plan your route so it provides maximum sight distance at highway-rail grade crossings. Do not attempt to cross the tracks unless you can see far enough down the track to know for certain that no trains are approaching. Passive crossings are those that do not have any type of traffic control device. Be especially careful at railroad-highway crossings. Even if there are active railroad signals that indicate the tracks are clear, you must look and listen to be sure it is safe to proceed.

10.5 – Student Management

10.5.1 – Don’t Deal with On-bus Problems When Loading and Unloading

In order to get students to and from school safely and on time, you need to be able to concentrate on the driving task. Loading and unloading requires all your concentration. Don’t take your eyes off what is happening outside the bus. If there is a behavior problem on the bus, wait until the students unloading are safely off the bus and have moved away. If necessary, pull the bus over to handle the problem.

10.5.2 – Handling Serious Problems

Tips on handling serious problems

- Follow your school’s procedures for discipline or referral of rights to ride the bus.
- Never put a student off the bus except at school or at his or her designated school bus stop. If you feel that the offense is serious enough that you cannot safely drive the bus, call for a school administrator or the police to come and remove the student. Always follow your local school district’s procedures for requesting assistance.

10.6 – Anti-lock Braking Systems

10.6.1 – Vehicles Required to Have Anti-lock Braking Systems

The Department of Transportation requires that anti-lock braking systems be on

- Air brakes vehicles, (trucks, buses, trailers and converter dollies) built on or after March 1, 1998; and

- No other vehicles shall be required to be equipped with anti-lock braking systems as a part of the initial certification of the vehicle.
10.6.2 – How ABS Helps You
When you brake hard on slippery surfaces in a vehicle without ABS, your wheels may lock up. When your steering wheel lock up, you lose steering control. When your other wheels lock up, you may skid or even spin the vehicle.

ABS helps you avoid wheel lock-up and maintain control. You may or may not be able to stop faster with ABS, but you should be able to steer around an obstacle while braking, and avoid skids caused by over braking.

10.6.3 – Braking with ABS
When you drive a vehicle with ABS, you should brake as you always have. In other words:

- Use only the braking force necessary to stop safely and stay in control.
- Brake the same way, regardless of whether you have ABS on the bus. However, in emergency braking, do not pump the brakes on a bus with ABS.
- As you slow down, monitor your bus and back off the brakes (if it is safe to do so) to stay in control.

10.6.4 – Braking if ABS is Not Working
Without ABS, you still have normal brake functions. Drive and brake as you always have.

Vehicles with ABS have yellow malfunction lamps to tell you if something is not working. The yellow ABS malfunction lamp is on the bus’ instrument panel.

As a system check on newer vehicles, the malfunction lamp comes on at start-up for a bulb check and then goes out quickly. On older systems, the lamp could stay on until you are driving over five mph. The lamp stays off after the bulb check, or goes on once you are under way, you may have lost ABS control at one or more wheels.

Remember, if your ABS malfunctions, you still have regular brakes. Drive normally, but get the system serviced soon.

10.6.5 – Safety Reminders

- Constantly check all mirrors and rear windows;
- Back slowly and smoothly;
- If no lookout is available:
  - Set the parking brake;
  - Turn off the motor and take the keys with you;
  - Walk to the rear of the bus to determine whether the way is clear;
- If you must back-up at a student pick-up point, be sure to pick up students before backing and watch for latecomers at all times;
- Be sure that all students are in the bus before backing;
- If you must back up at a student drop-off point, be sure to unload students after backing.

10.7 – Special Safety Considerations

10.7.1 – Strobe Lights

Some school buses are equipped with roof-mounted, white strobe lights. If your bus is so equipped, the overhead strobe light should be used when you have limited visibility. This means that you cannot easily see around you – in front, behind, or beside the school bus. Your visibility could be only slightly limited or it could be so bad that you can see nothing at all. In all instances, understand and obey Wyoming statutes and local regulations concerning the use of these lights.

10.7.2 – Driving in High Winds

Strong winds affect the handling of the school bus! The side of a school bus acts like a sail on a sailboat. Strong winds can push the school bus sideways. They can even move the school bus off the road or, in extreme conditions, tip it over.

If you are caught in strong winds:

- Keep a strong grip on the steering wheel. Try to anticipate gusts.
- You should slow down to lessen the effect of the wind, or pull off the roadway and wait.
- Contact your dispatcher to get more information on how to proceed.

10.7.3 – Backing

Backing a school bus is strongly discouraged. You should back your bus only when you have no other safe way to move the vehicle. You should never back a school bus when students are outside of the bus. Backing is dangerous and increases your risk of a collision. If you have no choice and you must back your bus, follow these procedures:

- Post a lookout. The purpose of the lookout is to warn you about obstacles, approaching persons, and other vehicles. The lookout should not give directions on how to back the bus;
- Signal for quiet on the bus;
- Slow down to lessen the effect of the wind;
- Keep a strong grip on the steering wheel;
- Turn off the motor and take the keys with you;
- Walk to the rear of the bus to determine whether the way is clear;
- If you must back up at a student pick-up point, be sure to pick up students before backing;
- If you must back up at a student drop-off point, be sure to unload students after backing.
PRE-TRIP VEHICLE INSPECTION TEST

This Section Covers

- **Internal Inspection**
- **External Inspection**

During the pre-trip inspection, you must show that the vehicle is safe to drive. You may have to walk around the vehicle and point to or touch each item and explain to the examiner what you are checking and why.

### 11.1 All Vehicles

Study the following vehicle parts for the type of vehicle you will be using during the CDL skills tests. You should be able to identify each part and tell the examiner what you are looking for or inspecting.

#### 11.1.1 Engine Compartment (Engine Off)

- **Leaks/Hoses**
  - Look for puddles on the ground;
  - Look for dripping fluids on underside of engine and transmission;
  - Inspect hoses for condition and leaks.

- **Oil Level**
  - Indicate where dipstick is located;
  - See that oil level is within safe operating range. Level must be above refill mark.

- **Coolant Level**
  - Inspect reservoir sight glass; or
  - (If engine is not hot), remove radiator cap and check for visible coolant level.

- **Power Steering Fluid**
  - Indicate where power steering fluid dipstick is located;
  - Check for adequate power steering fluid level. Level must be above refill mark.

- **Engine Compartment Belts**
  - Check the following belts for snugness (up to 3/4-inch play at center of belt), cracks, or frays:
    - Power steering belt;
    - Water pump belt;
    - Alternator belt;
    - Air compressor belt.

- **Note:** If any of the components listed above are not belt driven, you must:
  - Tell the examiner which component(s) are not belt driven;
  - Make sure component(s) are operating properly, are not damaged or leaking, and are mounted securely.

#### 11.1.2 – Cab Check/Engine Start

- **Oil Pressure Gauge**
  - Make sure oil pressure gauge is working;
  - Check that pressure gauge shows increasing or normal oil pressure or that the warning light goes off;
  - If equipped, oil temperature gauge should begin a gradual rise to the normal operating range.

- **Temperature Gauge**
  - Make sure the temperature gauge is working;
  - Temperature should begin to climb to the normal operating range or temperature light should be off.

- **Air Gauge**
  - Make sure the air gauge is working properly;
  - Build air pressure to governor cut-out, roughly 120-140 psi.

- **Ammeter/Voltmeter**
  - Check that gauges show alternator and/or generator is charging or that warning light is off.

- **Mirrors and Windshield**
  - Mirrors should be clean and adjusted properly from the inside;
  - Windshield should be clean with no illegal stickers, no obstructions, or damage to the glass.

- **Emergency Equipment**
  - Check for spare electrical fuses;
  - Check for three red reflective triangles;
  - Check for a properly charged and rated fire extinguisher.

- **Note:** If the vehicle is not equipped with electrical fuses, you must mention this to the examiner.

- **Steering Play**
  - Non-power steering: Check for excessive play by turning steering wheel back and forth. Play should not exceed 10 degrees (or about two inches on a 20-inch wheel);
  - Power steering: With the engine running, check for excessive play by turning the steering wheel back and forth. Play should not exceed 10 degrees (or about two inches on a 20-inch wheel) before front left wheel barely moves.

- **Wipers/Washers**
  - Check that wiper arms and blades are secure, not damaged, and operate smoothly;
  - If equipped, windshield washers must operate correctly.
Hydraulic Brake Check
With the parking brake released and the trailer parking brake engaged (combination vehicles only), check that the trailer parking brake will hold vehicle by gently trying to pull forward with the trailer parking brake on.

Parking Brake Check
With the parking brake engaged (trailer brakes released on combination vehicles), check that the parking brake will hold vehicle by gently trying to pull forward with parking brake on; and check proper release when using the manual brake release on combined braking systems. If equipped, check that the air brake is properly released during the air brake check. The proper procedures for performing this type of drum check must be done as specified.

Failure to perform an air brake check will result in an inspection failure. Be prepared to perform the same brake components inspection on every axle (power unit and trailer, if equipped).

Shock Absorbers
If vehicle is equipped with torsion bars, torque arms, or other types of suspension components, check that there are no missing nuts, bolts, or cotter keys.

See that shock absorbers are secure and that there are no leaks.

Drum Brake
If equipped, check that spacers are not bent, damaged, or rusted through.

Note: Be prepared to perform the same wheel inspection on every axle (power unit and trailer, if equipped).

Shock Absorbers
If equipped, check that shock absorbers are secure and that there are no leaks.

Air Brake Check (Air Brake Equipped Vehicles Only)
If equipped, check that shock absorbers are secure and that there are no leaks.

Failure to perform an air brake check will result in an inspection failure. Be prepared to perform the same brake components inspection on every axle (power unit and trailer, if equipped).

Steering Box/Hoses
Check that the steering box is securely mounted and not leaking. Look for any missing nuts, bolts, and cotter keys.

Check for power steering fluid leaks or damage to power steering hoses.

Steering Linkage
See that connecting links, arms, and rods from the steering box to the wheel are not worn or cracked.

Check that joints and sockets are not worn or loose and that there are no missing nuts, bolts, or cotter keys.

11.2.2 – Suspension
Springs/Air/Torque
Look for missing, shifted, cracked, or broken leaf springs;
Look for broken or distorted coil springs;
If vehicle is equipped with torsion bars, torque arms, or other types of suspension components, check that they are not damaged and are mounted securely;
Air ride suspension should be checked for damage and leaks.

Mounts
Look for cracked or broken spring hangers, missing or damaged bushings, and broken, loose, or missing bolts, u-bolts or other axle mounting parts. (The mounts should be checked at each point where they are secured to the vehicle frame and axle(s)).

Shock Absorbers
See that shock absorbers are secure and that there are no leaks.

11.2.3 – Brakes
Slack Adjusters and Pushrods
Look for broken, loose, or missing parts;
For manual slack adjusters, the brake pushrod should not move more than one inch (with the brakes released) when pulled by hand.

Brake Chambers
See that brake chambers are not leaking, cracked, or dented and are mounted securely.

Brake Hoses/Lines
Look for cracked, worn, or leaking hoses, lines, and couplings.

Drum Brake
Check for cracks, dents, or holes. Also check for loose or missing bolts;
Check for contaminants such as debris or oil/grease;
Brake linings (where visible) should not be worn dangerously thin.

Brake Linings
On some brake drums, there are openings where the brake linings can be seen from outside the drum. For this type of drum, check that a visible amount of brake lining is showing.

Note: Be prepared to perform the same brake components inspection on every axle (power unit and trailer, if equipped).

11.2.4 – Wheels
Rims
Check for damaged or bent rims. Rims cannot have welding repairs.

Tires
The following items must be inspected on every tire:
Tread depth: Check for minimum tread depth (4/32 on steering axle tires, 2/32 on all other axles)
Tire condition: Check that tread is evenly worn and look for cuts or other damage to tread or sidewalls. Also, make sure that valve caps and stems are not missing, broken, or damaged;
Tire inflation: Check for proper inflation by using a tire gauge, or inflation by striking tires with a mallet or other similar device.

Note: You will not get credit if you simply kick the tires to check for proper inflation.

Hub Oil Seals/Axle Seals
See that hub oil/grease seals and axle seals are not leaking and, if wheel has a sight glass, oil level is adequate.

11.2.5 – Side of Vehicle
Couplings should be secure and free of foreign objects.

Battery Box
Check that battery(s) are secure, connections are tight, and cell caps are present;
Battery connections should not show signs of excessive corrosion;
Battery box and cover or door must be secure.

Drive Shaft
Check that drive shaft is not bent or cracked;
Drive shafts should be securely and free of foreign objects.

Exhaust System
Check system for damage and signs of leaks such as rust or carbon soot;
System should be connected tightly and mounted securely.

Frame
Look for cracks, broken welds, holes or other damage to the longitudinal frame members, cross members, box, and floor.

11.2.6 – Rear of Vehicle
Splash Guards
If equipped, check that splash guards or mud flaps are not damaged and are mounted securely.

Doors/Tire/Lifts
Check that doors are not damaged and that they open, close, and latch properly from the outside, if equipped.

Ties, straps, chains, and binders must also be secure.
Check that the fifth wheel is positioned properly so that the tractor frame will clear the landing gear during turns.

Lighting Indicators
In addition to checking the lighting indicators listed in Section 10.2 of this manual, school bus drivers must also check the following lighting indicators (internal panel lights):

- Alternately flashing amber lights indicator, if equipped
- Alternately flashing red lights indicator
- Strobe light indicator, if equipped

Lights/Reflectors
In addition to checking the lights and reflective devices listed in Section 10.2 of this manual, school bus drivers must also check the following (external) lights and reflectors:

- Strobe light, if equipped
- Stop arm light, if equipped
- Alternately flashing amber lights, if equipped
- Alternately flashing red lights

Student Mirrors
In addition to checking the external mirrors, school bus drivers must also check the internal and external mirrors used for observing students:

- Check for proper adjustment
- Check that all internal and external mirrors and mirror brackets are not damaged and are mounted securely with no loose fittings
- Check that visibility is not impaired due to dirty mirrors.

Stop Arm
If equipped, check the stop arm to see that it is mounted securely to the frame of the vehicle. Also, check for loose fittings and damage.

Passenger Entry/Lift
Check that the entry door is not damaged, operates smoothly, and closes securely from the inside.

- Hand rails are secure and the step light is working, if equipped.
- The entry steps must be clear with the treads not loose or worn excessively.
- If equipped with a handicap lift, look for leaking, damaged, or missing parts and explain how lift should be checked for correct operation. Lift must be fully retracted and latched securely.

Emergency Exit
- Make sure that all emergency exits are not damaged, operate smoothly, and close securely from the inside.
- Check that any emergency exit warning devices are working.

Seating
- Look for broken seat frames and check that seat frames are firmly attached to the floor;
- Check that seat cushions are attached securely to the seat frame

11.4 – Trailer

11.4.1 – Trailer Front
Air/Electrical Connections
- Check that trailer air connectors are sealed and in good condition;
- Make sure glad hands are locked in place, free of damage or air leaks;
- Make sure the trailer electrical plug is firmly seated and locked in place.

Header Board
- If equipped, check the header board to see that it is secure, free of damage, and strong enough to contain cargo.
- If equipped, the canvas or tarp carrier must be mounted and fastened securely.
- On enclosed trailers, check the front area for signs of damage such as cracks, bulges, or holes.

11.4.2 – Side of Trailer
Landing Gear
- Check that the landing gear is fully raised, has no missing parts, crank handle is secure, and the support frame is not damaged.
- If power operated, check for air or hydraulic leaks.

Doors/Ties/Lifts
- If equipped, check that doors are not damaged. Check that doors open, close, and latch properly from the outside;
- Check that ties, straps, chains, and binders are secure;
- If equipped with a cargo lift, look for leaking, damaged or missing parts and explain how it should be checked for correct operation.
- Lift should be fully retracted and latched securely.

Frame
- Look for cracks, broken welds, holes or other damage to the frame, cross members, box, and floor.

Tandem Release Arm/Locking Pins
- If not equipped, make sure the locking pins are locked in place and release arm is secured.

11.4.3 – Remainder of Trailer
Remainder of Trailer
Please refer to Section 11.2 of this manual for detailed inspection procedures regarding the following components:

- Wheels;
- Suspension system;
- Brakes;
- Doors/ties/lift;
- Splash guards.

11.5 – Coach/Transit Bus

11.5.1 – Passenger Items
Passenger Entry/Lift
- Check that entry doors operate smoothly and close securely from the inside;
- Check that hand rails are secure and, if equipped, that the step light(s) are working;
- Check that the entry steps are clear, with the treads not loose or worn excessively;
- If equipped with a handicap lift, look for leaking, damaged or missing part, and explain how it should be checked for correct operation;
- Lift should be fully retracted and latched securely.

Emergency Exits
- Make sure that all emergency exits are not damaged, operate smoothly, and close securely from the inside;
- Check that any emergency exit warning devices are working.

Passenger Seating
- Look for broken seat frames and check that seat frames are firmly attached to the floor;
- Check that seat cushions are attached securely to the seat frames.

11.5.2 – Entry/Exit Doors/Mirrors
- Check that entry/exit doors are not damaged and operate smoothly from the outside. Hinges should be secure with seals intact;
- Make sure that the passenger exit mirrors and all external mirrors and mirror brackets are not damaged and are mounted securely with no loose fittings.

- Check for leaks; mechanism of the sliding fifth wheel. If air powered, check for leaks; check for leaks;
- If equipped with a cargo lift, look for leaking, damaged or missing parts and explain how it should be checked for correct operation.
- Lift should be fully retracted and latched securely.

Frame
- Look for cracks, broken welds, holes or other damage to the frame, cross members, box, and floor.

Tandem Release Arm/Locking Pins
- If not equipped, make sure the locking pins are locked in place and release arm is secured.
11.6.2 – Class B and C Pre-Trip Inspection Test

If you are applying for a Class B CDL, you will be required to perform one of the three versions of a pre-trip inspection in the vehicle you have brought with you for testing. Each of the three tests are equivalent and you will not know which test you will take until just before the testing begins. All of the tests include an engine start, an in-cab inspection, and an inspection of the coupling system. Then, your test may require an inspection of the entire vehicle or only a portion of the vehicle which your CDL examiner will explain to you. You will also have to inspect any special features of your vehicle (e.g., school or transit bus).

Section 12
BASIC VEHICLE CONTROL SKILLS TEST

This Section Covers
- Skills Test Exercises
- Skills Test Scoring

Your basic control skills could be tested using one or more of the following exercises off-road or somewhere on the street during the road test:
- Straight-line backing;
- Offset back/right;
- Offset back/left; and
- Alley dock.

These exercises are shown in Figures 12-1 through 12-6.

12.1 – Scoring

- Pull-ups;
- Vehicle Exits;
- Final Position

Encroachments - The examiner will score the number of times you touch or cross over an exercise boundary line with any portion of your vehicle. Each encroachment will count as an error.

Pull-ups - You will not be penalized for initial pull-ups. However, an excessive number of pull-ups will count as errors.

Vehicle Exits - You may be permitted to safely stop and exit the vehicle to check the external position of the vehicle. When doing so, you must place the vehicle in neutral and set the parking brake(s) and then, when exiting the vehicle, you must do so safely by facing the vehicle and maintaining three points of contact with the vehicle at all times. If you do not safely secure the vehicle or safely exit the vehicle it may result in an automatic failure of the basic control skills test.

Final Position - It is important that you finish each exercise exactly as the examiner has instructed you. If you do not maneuver the vehicle into its final position as described by the examiner, you will be penalized and could fail the basic skills test.

12.2 – Exercises

12.2.1 – Straight-Line Backing

You may be asked to back your vehicle in a straight line between two rows of cones without touching or crossing over the exercise boundaries. (See Figure 12.1.)
12.2.4 – Alley Dock
You may be asked to sight-side back your vehicle into an alley, bringing the rear of your vehicle as close as possible to the rear of the alley without going beyond the exercise boundary marked by a line or row of cones. You are required to get your vehicle completely into the space with your entire vehicle straight with the alley. (See Figure 12.4.)

Section 13
ON-ROAD DRIVING
This Section Covers

How You Will Be Tested
You will drive over a test route that has a variety of traffic situations. At all times during the test, you must drive in a safe and responsible manner.

During the driving test, the examiner will be scoring you on specific driving maneuvers as well as on your general driving behavior. You will follow the directions of the examiner. Directions will be given to you so you will have plenty of time to do what the examiner has asked. You will not be asked to drive in an unsafe manner.

If your test route does not have certain traffic situations, you may be asked to simulate a traffic situation. You will do this by telling the examiner what you are or would be doing if you were in that traffic situation.

13.1 – How You Will Be Tested

13.1.1 – Turns
You have been asked to make a turn:
- Check traffic in all directions;
- Use turn signals and safely get into the lane needed for the turn.

As you approach the turn:
- Use turn signals to warn others of your turn;
- Slow down smoothly, change gears as needed to keep power, but do not coast unsafely. Unsafe coasting occurs when your vehicle is out of gear (clutch depressed or gearshift in Neutral) for more than the length of your vehicle.

If you must stop before making the turn:
- Come to a smooth stop without skidding;
- Come to a complete stop behind the stop line, crosswalk, or stop sign;
- If stopping behind another vehicle, stop where you can see the rear tires on the vehicle ahead of you (safe gap);
- Do not let your vehicle roll;
- Keep the front wheels aimed straight ahead.

When ready to turn:
- Check traffic in all directions;
- Keep both hands on the steering wheel during the turn;
- Do not change gears during the turn;
- Keep checking your mirror to make sure the vehicle does not hit anything on the inside of the turn;
- Vehicle should not move into oncoming traffic;
- Vehicle should finish turn in correct lane.

After turn:
- Make sure turn signal is off;
- Make sure turn signal is off;
- Brake smoothly and, if necessary, change gears;
- If necessary, come to a complete stop (no coasting) behind any stop signs, signals, sidewalks, or stop lines maintaining a safe gap behind any vehicle in front of you;
- Your vehicle must not roll forward or backward.

13.1.2 – Intersections
As you approach an intersection:
- Check traffic thoroughly in all directions;
- Decelerate gently;
- Brake smoothly and, if necessary, change gears;
- Yield to any pedestrians and traffic in the intersection.

Do not change lanes or shift gears while proceeding through the intersection;
- Keep your hands on the wheel.

Once through the intersection:
- Continuously monitor traffic;
- Accelerate smoothly and change gears as necessary.

13.1.3 – Urban/Rural Straight
During this part of the test, you are expected to make regular traffic checks and maintain a safe following distance. Your vehicle should be centered in the proper lane (right-most lane) and you should keep up with the flow of traffic but not exceed the posted speed limit.

13.1.4 – Lane Changes
During multiple lane portions of the test, you will be asked to change lanes to the left, and then back to the right. You should make the necessary traffic checks first, then use proper signals and smoothly change lanes when it is safe to do so.

13.1.5 – Expressway
Before entering the expressway:
- Check traffic;
- Use proper signals;
- Merge smoothly into the proper lane of traffic.

Once on the expressway:
- Maintain proper lane positioning, vehicle spacing, and vehicle speed;
- Continue to check traffic thoroughly in all directions.

When exiting the expressway:
- Make necessary traffic checks;
- Use proper signals;
- Decelerate smoothly in the exit lane.
Check traffic in all directions. Look and listen for the presence of trains; should:

Before reaching the crossing, all commercial drivers should:
Decelerate, brake smoothly, and shift gears as necessary;
Look and listen for the presence of trains;
Check traffic in all directions.

Do not stop, change gears, pass another vehicle, or change lanes while any part of your vehicle is in the crossing. If you are driving a bus, a school bus, or a vehicle displaying placards, you should be prepared to observe the following procedures at every railroad crossing (unless the crossing is exempt):
As the vehicle approaches a railroad crossing, activate the four-way flashers;
Stop the vehicle within 50 feet but not less than 15 feet from the nearest rail;
Listen and look in both directions along the track for an approaching train and for signals indicating the approach of a train. If operating a bus, you may also be required to open the window and door prior to crossing tracks;
Keep hands on the steering wheel as the vehicle crosses the tracks;
Do not stop, change gears, or change lanes while any part of your vehicle is proceeding across the tracks;
Four-way flashers should be deactivated after the vehicle crosses the tracks;
Continue to check mirrors and traffic. Not all driving road test routes will have a railroad crossing. You may be asked to explain and demonstrate the proper railroad crossing procedures to the examiner at a simulated location.

13.1.9 – Bridge/Overpass/Sign
After driving under an overpass, you may be asked to tell the examiner what the posted clearance or height was. After going over a bridge, you may be asked to tell the examiner what the posted weight limit was. If your test route does not have a bridge or overpass, you may be asked about another traffic sign. When asked, be prepared to identify and explain to the examiner any traffic sign which may appear on the route.

13.1.10 – Student Discharge (School Bus)
If you are applying for a school bus endorsement, you will be required to demonstrate loading and unloading students. Please refer to section 10 of this manual for procedures on loading and unloading school students. During the driving test you must:
Wear your safety belt;
Obey all traffic signs, signals, and laws;
Complete the test without a crash or moving violation.

You will be scored on your overall performance in the following general driving behavior categories:

13.1.11 – Clutch Usage (for Manual Transmission)
Always use clutch to shift;
Double-clutch if vehicle is equipped with non-synchronized transmission;
Do not rev or lug the engine;
Do not ride clutch to control speed, coast with the clutch depressed, or “pop” the clutch.

13.1.12 – Gear Usage (for Manual Transmission)
Do not grind or clash gears;
Select gear that does not rev or lug engine;
Do not shift in turns and intersections.

13.1.13 – Brake Usage
Do not ride or pump brake;
Do not brake harshly. Brake smoothly using steady pressure.

13.1.14 – Lane Usage
Do not put vehicle over curbs, sidewalks, or lane markings;
Stop behind stop lines, crosswalks, or stop signs;
Complete a turn in the proper lane on a multiple lane road (vehicle should finish a left turn in the lane directly to the right of the center line);
Finish a right turn in the right-most (curb) lane;
Move to or remain in right-most lane unless lane is blocked.

13.1.15 – Steering
Do not over or under steer the vehicle;
Keep both hands on the steering wheel at all times unless shifting. Once you have completed shift, return both hands to the steering wheel.

13.1.16 – Regular Traffic Checks
Check traffic regularly;
Check mirrors regularly;
Check mirrors and traffic before, while in, and after, an intersection;
Scan and check traffic in high-volume areas and areas where pedestrians are expected to be present.

13.1.17 – Use of Turn Signals
Use turn signals properly;
Activate turn signals when required;
Activate turn signals at appropriate times;
Cancel turn signals upon completion of a turn or lane change.